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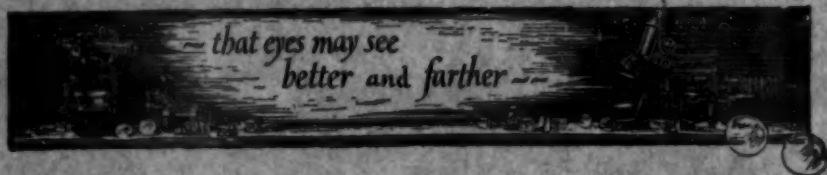
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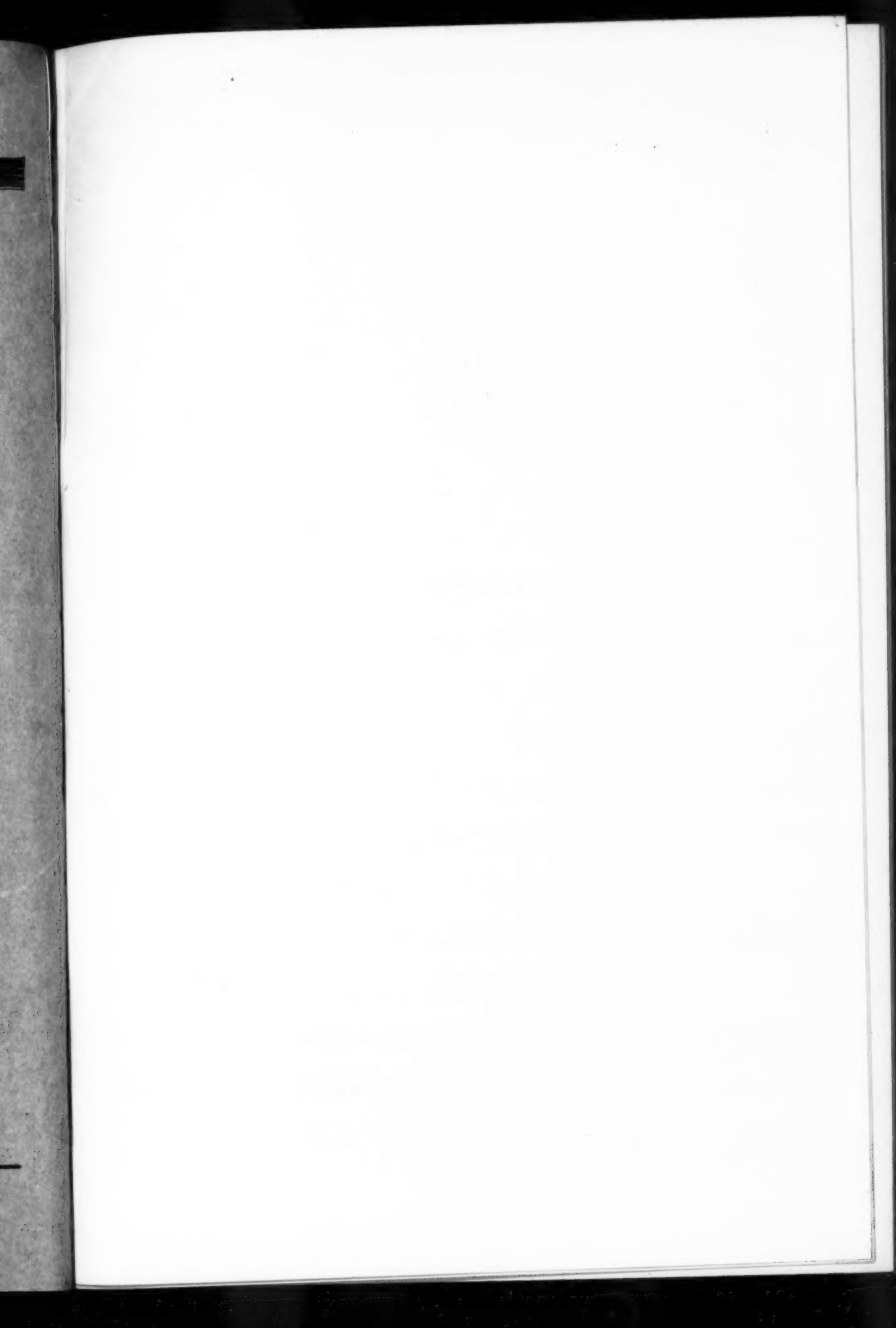
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RIGHT EYE



LEFT EYE



RETICULAR KERATITIS. (BYERS). OPACITIES SHOWN BY OPHTHALMOSCOPIC  
AND OBLIQUE ILLUMINATION. (SKETCHES BY DR. GROSS).



# AMERICAN JOURNAL OF OPHTHALMOLOGY

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## RETICULAR KERATITIS

W. GORDON M. BYERS, M.D.

MONTREAL, CANADA.

This is the detailed report of a case, presenting novel clinical findings; with special reference to the bearing of these findings upon the etiology of reticular keratitis.

Among the rare diseases of the cornea, lattice-like or reticular keratitis occupies a foremost place in point of interest. The morphologic features of this entity are now fairly well defined, and a little work has been done on its morbid histology; but a full explanation of the curious disorder awaits the chance of an examination of an eye affected in this way, as well as the solution of some of the most difficult problems in ocular pathology.

Some novel clinical findings in the following case seem, in the meantime, however, to throw some light upon the origin of the corneal changes, and to point to the general factors which may predispose to the local condition. Especially is this true if one studies the case in connection with observations on closely related keratitides.

The patient was a physician, aged 47, who began to feel about a year previously that he needed stronger glasses for reading, and that he was shooting badly. He stated also that he saw three images with either eye. A white line against a black background, for instance, appeared in triplicate, the lateral lines being about equidistant from, but not nearly so clearly defined as, the middle one. As a consequence people looked broader and stouter owing to overlapping of the images. There was no history of injury, and no other complaints (including hemeralopia and nyctalopia).

The man had had measles and scarlet fever in childhood, and typhoid at fourteen. After that no illness until 1912, when for 11 months he had attacks of renal colic occasioned by the slow passage of a stone. A cancer of the right breast, which seemed to follow a fall on

the side, rupturing a rib, was removed in April, 1917.

In the family history it was to be noted that there had been no hereditary eye trouble in the three generations of which the patient had knowledge. There did seem to be, however, a tendency to malignancy and to arterial degeneration. Two of his maternal aunts, as well as a maternal cousin (female), had died of cancer; while both his father's father and mother, and one paternal aunt, had succumbed to apoplexy. His father died at 62 of diabetes, after being afflicted with this condition for 10 years; his mother of cardiovascular disease at 44.

Taking in particularly the central area of the corneæ, and without the slightest sign of any irritation or congestion, one saw the changes which have been described under the term "reticular" or "lattice-like" keratitis, and are more fully dealt with later in this report. I had never seen a case of this kind, but I immediately recognized it from Hudson's illustration (1), which had stamped itself on my memory.

The accompanying plate from a sketch by Dr. Gross gives an approximate idea of the distribution of the opacities as seen by transillumination, and by oblique illumination.

With the corneal microscope, in the short period I was able to have the patient under observation, I satisfied myself that the lines were in or immediately beneath Bowman's membrane. I could not determine with certainty what position the opacities occupied in relation to the surface of the cornea. They seemed at times to be depressed below, at others raised above, the epithelial coverings. I think both conditions existed. In any

case the unevenness of the surface was everywhere shown by a slight, but definite, distortion of the mires of the ophthalmometer.

The threads of the reticulum seemed to spring directly from one another; but rarely one could see lines, more deeply situated, crossing beneath those more superficially placed. Not infrequently one came across streaks, the continuity of which was occupied for a short distance by a chain of minute, sand-like beads of crystalline substance. These were particularly well seen when the pupil was dilated.

The pupils, while equal and regular, were unusually active to light. There were no changes in the fundi. The fields of vision were full; and central vision was as follows:

R., With—cyl. 1.0 D. axis 90, 6/12.

L., With—cyl. 1.0 D. axis 75, 6/12.

With + sphere 1.5 D. added, Sn.1. with each eye at 12". At the first consultation tension was as follows: R., 15 mm. Hg.; L., 13 mm. Hg. A year later (after twelve months of great activity), the doctor again unselfishly submitted to a further reading of tension, which was found to equal on both sides about 13.5 mm. Hg.

The systemic examination carried out for me by Dr. Cushing yielded the following facts: General condition good; patient considerably over weight (197 lbs.; no change in three years). Lungs normal. Heart normal, except for occasional ventricular extra systoles; no evident arteriosclerosis; blood pressure 135—90; abdomen negative; digestive system normal. The faintest trace of sugar in the urine; otherwise examination of the kidneys negative. Nothing found anywhere to suggest past or present tuberculosis. Wassermann, etc., negative.

Summarizing, Dr. Cushing wrote as follows: "Altho nothing definite was found, still the excess of abdominal fat, missed beats in the heart, recent carcinoma, and renal calculus give the impression of a man past his prime and showing signs of degeneration."

#### REMARKS.

Since Dimmer's paper (2), the linear opacities in reticular keratitis have been

attributed to rucking of Bowman's membrane. Close inspection of the cornea with binocular magnification would probably convince anyone of the correctness of this view. The changes are certainly not more superficial, because they persist after exfoliation of the epithelium. On the other hand, the unevenness of the corneal surface, the refractive nature of the lines, and particularly their transparency in the direction of their course, all speak in favor of foldings of Bowman's membrane.

Now folding of Bowman's membrane is a well recognized and, in my experience, not uncommon microscopic finding in soft, atrophic eyeballs. The condition is clearly shown in association with corrugation of Descemet's membrane (Fig. 1.), in the accompanying microphotograph of the cornea of an eyeball greatly shrunken from plastic uveitis. I did not see this globe before its removal, and there are singularly few observations in the literature regarding the clinical appearances produced by the bucklings in Bowman's membrane. Parsons (3), without describing them, mentions having seen striate opacities from this cause, and quotes the case of Schirmer (4),—that of "a shrunken globe, in which the cornea was much diminished in size, hazy, and traversed by fan-like stripes, diverging above, where they did not reach the corneal margin, and ending below in a horizontal, slightly bent, gray line. In horizontal sections, there were six waves in the epithelial surface, below which were sharp triangular depressions in Bowman's membrane, which was intact."

More important are the observations of Spicer (5). This writer described in 1916, under the name of superficial linear keratitis, a series of cases in which, with pain and congestion, a number of superficial ridges of epithelium suddenly made their appearance in the cornea. These ridges were raised from the general level of the corneal surface; were, for the most part, vertical in arrangement; and gray in color, with tapering ends, not reaching to the limbus. Under magnification, the ridges were seen to be double contoured with a comparatively clear center

Almost always, during at least some portion of the attack, there was a softening of the eye, tension falling to  $-1$ , and often to  $-2$ . The attack itself lasted for a few days to a week or longer; and, as the ridges disappeared, the vision recov-

diminished tension has not heretofore been made out in these cases cannot be used as an argument against the supposition; for we may well have had in them, as in chronic glaucoma, variations so slight as to call for the more sensitive

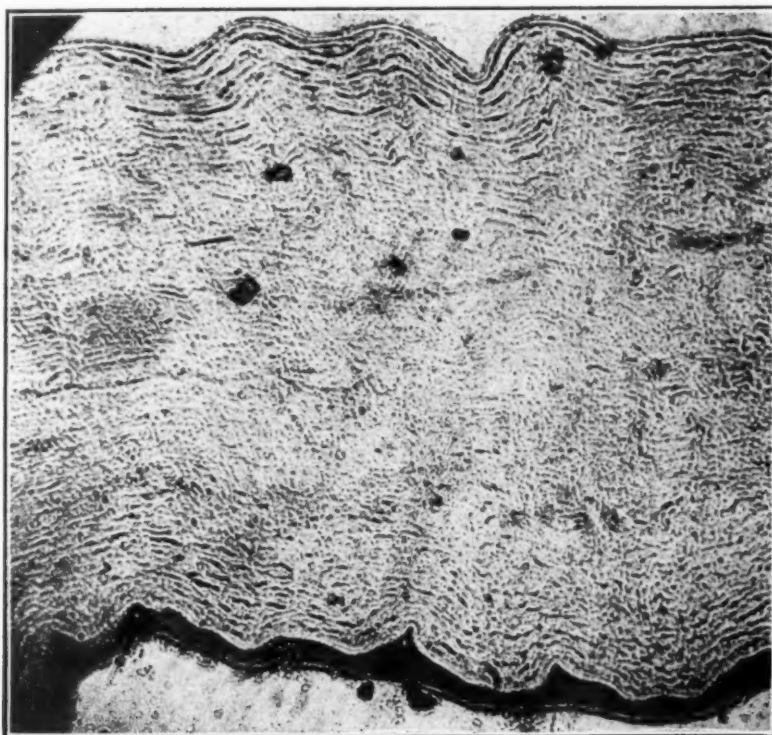


Fig. 1—Section of cornea showing corrugations of Bowman's membrane in association with marked ruckling of Descemet's membrane.

ered and the tension became normal again.

Microscopic examination of two eyes by Affleck showed that the linear opacities were due to ridges in Bowman's membrane. The ridges varied in appearance in different places; but they were always characterized by the presence of new fibrous tissue in the immediately underlying *substantia propria*.

In the light of this evidence, and the finding of the hypotonia in my case, one is justified in advancing the hypothesis that reticular keratitis has its origin in lowered intraocular tension; and the same would hold for nodular and fleck-shaped keratitis if the view of Fehr (6) be correct, that the three conditions are but phases of a single entity. The fact that

tonometer for detection. The complicated arrangement of the corneal opacities in reticular keratitis bespeaks a low-grade hypotonia of long standing; in contrast with the coarser changes in Spicer's cases, which were characterized by sudden reductions of comparatively short duration. We may have, in a word, in this group of cases, underlying hypotonias which correspond to acute and chronic glaucoma.

Incidentally it will be interesting to observe if eyeballs with greatly diminished tension following sclero-corneal trephining will develop changes similar to those in reticular keratitis. In the few cases thus affected among my own patients I have been unable, however, to detect anything of a like nature.

The myopic astigmatism contrary to the rule is another point in the present case which favors the hypothesis of hypotonia; for, granting diminished tension, the increased corneal curvature would naturally be greater between the stronger pair of opposing muscles. Biber's case (7) showed the same error of refraction, which might be more carefully looked for in the future. In the left eye of my patient, the lines could be plainly seen to correspond rather closely to the oblique axis of the cylinder (See Plate IX).

The crystalline beads can be interpreted in other ways, e. g., as the terminal phase of a hyalin degeneration, or as detritus following the nutritional death of cellular elements; but, more probably, they are residual from a preexistent transudation of corneal lymph, which may well have been into clefts created by a separation of Bowman's membrane from the *substantia propria*. Whatever view we adopt, we might surmise further that these bodies (or even a lymph with a more concentrated saline content) are responsible, thru irritation, for the connective tissue deposits observed by Affleck; and that the connective tissue in turn is the cause of the wide spread gray-ing of the cornea that marks the later stages of reticular keratitis and the related keratitides. Taking as a whole the few observations that have been made in connection with this group of cases, we have in the crystalline, hyalin, and connective tissue deposits exactly those changes one would expect to find as the result of a stasis associated with hypotonia.

Studying the cases of reticular keratitis that have heretofore been reported, one feels that the systemic examinations have been inadequate. Where possible every patient affected in this way should be exhaustively studied, preferably in a metabolic ward, with a view to detecting disturbances that might possibly underlie the hypotonia. In the hereditary groups, hereditary defects might be discovered.

Following the lead suggested by the slight glycosuria in my case, and having in mind the observations of Riesman (8)

and others regarding the association of hypotonia with diabetic coma, I investigated, with the assistance of Dr. E. A. McCusker, the ocular tension in a number of cases of diabetes in the metabolic ward. In these we found that the average reading was slightly below the normal lower limit. Another series of readings in ambulatory diabetics (former in-patients in attendance as out-patients) gave, however, only normal findings. This suggested to me that rest and confinement were responsible for the low readings in the first group; and this observation was confirmed by similar low figures in a number of surgical patients who were incapacitated solely by fracture and the like. The number of cases studied in this way is too few to permit one to dogmatize; but the assumption that the intra-ocular tension, in keeping with the general blood pressure, is lowered by rest is obvious in any case. One has here an indication both for glaucoma and hypotonia (reticular keratitis). In the present case it is apparent that retardation of the process could only follow a betterment of the physical condition thru massage, out-of-door exercise, diet, and the like.

That neither reticular keratitis nor any of the related conditions is a true inflammation is, apart from the findings enumerated, evidenced by the fact that at no time in their course is there new-vessel formation; and that congestion is present only in response to denudation of the epithelium, or in the later stages, perhaps as the result of the irritation of which I have spoken. The word keratitis should, therefore, be abandoned. In its place one could employ the term anterior (or superficial) corneal corrugations (or corrugations of Bowman's membrane), from acute or chronic hypotonia; in contradistinction to the posterior (or deep-seated) corneal corrugations (or corrugations of Descemet's membrane), from diminished tension, which are with even less reason covered by the appellation keratitis striata. Classic equivalents of these terms are easily coined.



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## PHAKOERISIS

IGNACIO BARRAQUER, M.D.

BARCELONA, SPAIN

The evolution of this operation with the difficulties overcome in perfecting it are here described. The manner of using the suction instrument by which one extracts the lens in its capsule is shown in the illustrations. The results attained in one thousand cases done after the method has been perfected are also reported. See also p. 770.

There has been much written and spoken on Phakoerisis, since I presented the first note to the Academies, and many

succinctly the origin and the vicissitudes of the proceeding and instrument; until I got a *modus faciendi* that allowed me



Fig. 1—Operation of phakoerisis (Barraquer); making puncture for corneal incision.

distinguished colleagues have been eager to experiment with a procedure for total extraction of cataracts of all varieties, with the minimum of accidents. But they could guide themselves only by the limited data I had previously published and by the accounts that they could read from the Spanish and foreign oculists, who saw me operating in the School of Medicine of Barcelona. They got a pseudoerisiphake from different makers, trying it without knowing my technic, and without knowledge of how I overcame the first difficulties.

With statistics of some thousand cases, I now have the pleasure of explaining

to obtain excellent results in the cases that I now have the honor to report.

Convinced that we should not make partial extractions, on account of certain imperfections of the method, I tried during a series of months the procedures of total extraction, without complete satisfaction with any of them. I found better the operation which drew out the crystalline lens catching and drawing it, in spite of the brittleness of the capsule; nearly always converting this procedure into an extraction with cystotomy.

I sought an instrument in order to catch the crystalline lens with sufficient strength and to pull it out from the zo-





Fig. 2—Phakoerisis. Position of knife after making counter puncture.

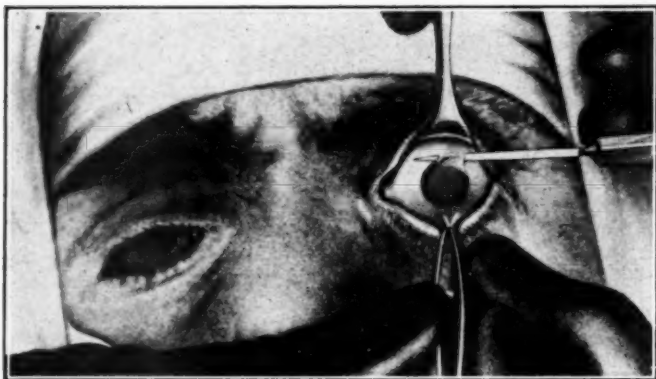


Fig. 3—Corneal section completed, knife forming conjunctival flap.



Fig. 4—Erisiphake in position to be introduced thru corneal incision.

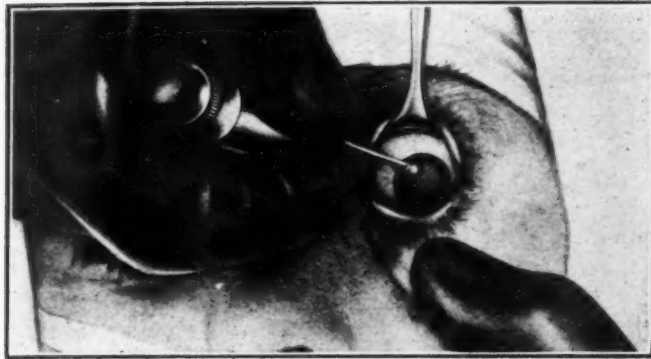


Fig. 5—Erisiphake tip introduced into anterior chamber.

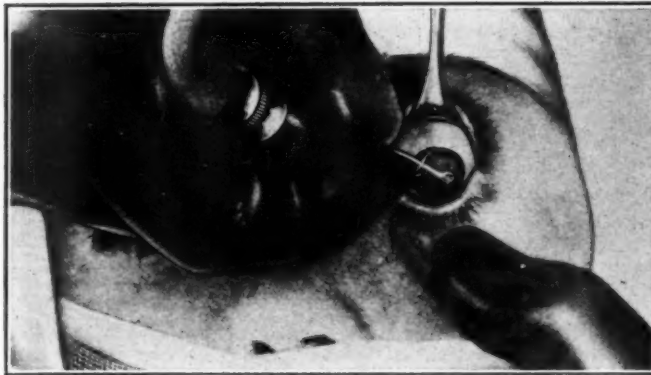


Fig. 6—Erisiphake carried thru pupil in contact with lens.

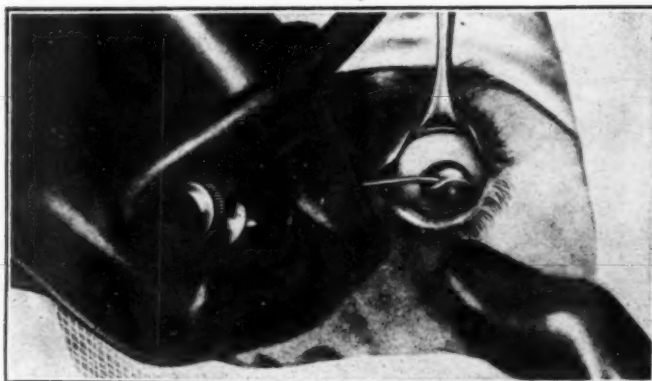


Fig. 7—Erisiphake attached to lens by suction, breaking the suspensory ligament.

nula with sufficient gentleness not to tear its thin envelope. Nature suggested it to me in the tentacula of the polypi, in the fingers of the small green frogs, in the extremities of the leeches that with their vents grasp strongly and without

the canula adapted to the aspirator, thru the incision in a man with ripe senile cataract. When I was convinced that it was impossible to pass it thru the pupil in order to adapt it on the anterior surface of the lens as was my

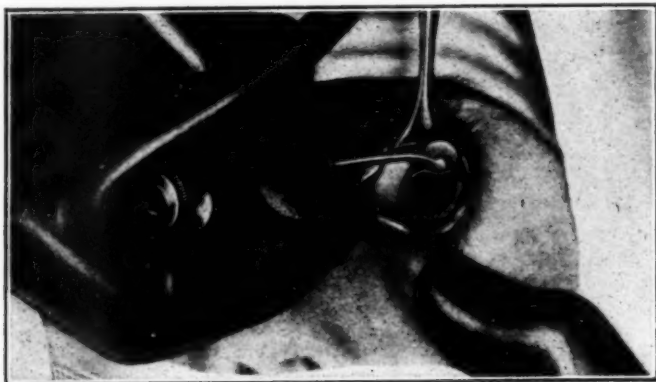


Fig. 8—Lens being drawn from the eye by the erisiphake.

violence. Therefore I decided to build an artificial vent that combines the necessary conditions to catch and remove the crystalline lens.

intention, I performed an extensive iridectomy, that permitted me to apply the same canula with the greatest facility. But strong buccal suction caused the ad-

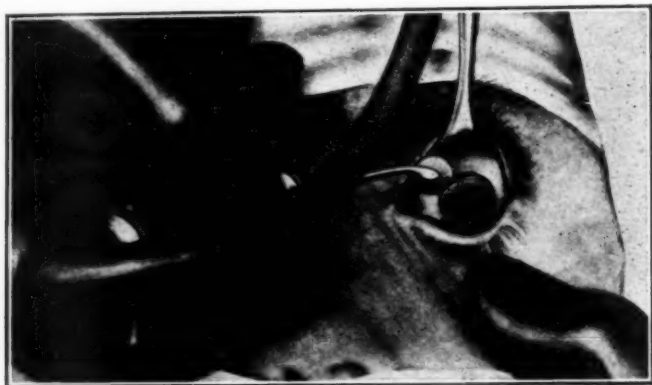


Fig. 9—Erisiphake holding lens after its removal from the eye.

The canula of the aspirator of Redar in the shape of a cup served me for my first trial. Theoretically I was convinced that the eyes of corpses or of lower animals would not serve for the trial. Because the conditions of resistance of the zonula, the elasticity of the iris and the consistence of the crystalline lens are very different from those of the patient with cataract. I therefore introduced

hesion, but not with enough strength to pull out the crystalline lens by the breaking of the zonula. After various attempts, during which I tried to increase the vigor of my suction, I succeeded with this first patient. The visual acuity equalled 1.00.

The sizes of this canula were excessive, and the strength of my suction insufficient. I therefore constructed for my

second trial some smaller openings, a receiver with vacuumeter and an aspirating pump; that allowed me to make attempts to determine the proper area of the opening and the intensity of the vacuum. Taking care to recognize that the resistance of the zonula and the friability of the capsule differed with the physical condition of the cataract, the age and the general state of the patient, I made this second attempt on a patient again, with iridectomy; convincing myself by

ple extraction, there were no incarcerated fibres of the zonula, the postoperative hernias of the iris marred the greatest part of my operated cases.

Another obstacle to the simple extraction was the difficulty of going thru the pupil, always smaller than the diameter of the cataract. This difficulty I overcame by having the cataract emerge by the superior edge, placing the tip on the lower part of the crystalline lens, but not to its peri-



Fig. 10—Toilet of wound after phakoerisis. (Bar raquer.)

the operation, that the intensity of the vacuum must oscillate between 40 and 60 degrees, and must be in direct relation with the hardness of the cataract; and the area of the opening in direct relation with its softness.

In successive attempts, in order to get greater adherence and avoid the breaking of the capsule, I provided my opening with a flat edge, with obtuse limits; and constructed a pneumatic machine, that producing an adjustable vacuum, could communicate to it vibrations which as to frequency and amplitude corresponded to the elasticity of the crystalline lens. Some patients, contrary to what I hoped, had iritis and iridochoroiditis. To avoid the incarceration of the fibres of the zonula in the wound, I attempted, after this, to make the simple extraction, in order that the eserine could withdraw the fibres after the intervention. The great difficulty of introducing the tip thru the pupil compelled me to instill a mydriatic before the operation. Altho in sim-

phery. I give a lever movement forwards of this edge, insinuating it in the pupil. Without this maneuver the resistance of the sphincter loosens the cataract and when the tip is applied again in order to catch for the second time, one might aspirate a portion of the vitreous thru the space left by zonular fibres already broken by the first attempt.

Although the dimensions of the incision were not greater than usual, I often had collapse of the cornea, and inversions of the iris. This I avoided by avoiding the extreme cocaineization that I was practicing in order to get the needful mydriasis; and substituting euphthalmin.

The hernias of the vitreous body have been very rare and always caused by rude movements of the patient or contraction of the orbicularis.

In reviews, letters, and conversations, there has been imputed to this proceeding the necessity of making a larger incision, the danger of submerg-

ing the crystalline lens—objections and accidents arising only thru lack of surgical dexterity on the part of the operator or thru the defects of his instruments.

In the cinematographic films and pictures here, I have shown the results of my first trials. The reader will thus be able to compare the inoffensiveness and the rapidity of the phakoerisis with the repeated maneuvers of cystotomy and the contusions of the eye in the Smith operation; and also to form a clear idea of the technic of my operation.

One should observe the dimensions of the incision, the manner of introducing the tip into the pupil, and the lever movement which is necessary for withdrawing it with the cataract.

Apart from the first groups of cases experimented on in order to determine the technic, that I am now following, the statistics of my first thousand cases are as follows:

In 1,000 operated:

Hernias of the vitreous body.....	7
Inversion of the iris.....	2
Breaking capsule .....	4
Luxation of crystalline lens.....	3
Infections .....	2
Hernias of the iris.....	7
Hemorrhages anterior chamber ....	5
Incarcerations of zonula .....	5
Expulsive hemorrhages .....	1

#### VISUAL ACUTENESS.

0.7 to 1.	694	69.4%
0.3 to 0.7	240	24. %
0.0 to 0.3	63	6.3%
0.0	3	.3%
Conjunctival incision .....	685	
With previous suture.....	315	
Simple extraction .....	219	
Extraction with peripheric iridec- tomy .....	530	
Combined extraction .....	251	

In closing, I would recommend to my colleagues the use of the phakoerisis in all cases of senile cataract, making a simple extraction in the hard senile or shrunken cataracts, and in docile patients, with good general condition, who are more than sixty years old. Extraction with peripheric iridectomy in the most cases, reserving the iridectomy for the very swollen and beginning cataracts and in young persons. The corneal incision is preferable to the sclero-conjunctival vertex, with previous suture.

The erisiphake must be perfect in all its proportions, and sizes, the valves must move with smoothness and produce the desired effect with rapidity. The source of vacuum must be reliable, and adjustable, and its intensity sustained altho the valves of the erisiphake are opened at times. The vacuum should be vibrating, and its vibration isochronic with that of the lens capsule.

### THE SAFEST METHOD OF CATARACT EXTRACTION.

RODERIC O'CONNOR, M.D.,

SAN FRANCISCO, CALIFORNIA.

This paper is an adverse criticism of the Smith or Indian method of extracting cataract in the capsule. It contests the claim that the method is the safest and best for general adoption without denying that it may have a proper place in the practice of certain operators and under circumstances adverse to other methods of operating. Read before the annual meeting of the Medical Society of the State of California, and published thru the courtesy of the society and its journal.

This paper may seem to be more of an attack on the Smith-Indian operation than a detailed description of the safest method of cataract extraction; but I believe it justifiable because, in my opinion that operation is the least safe of all methods.

The patient is certainly entitled to be operated by a method which, for his

age and type of cataract, offers the return of useful vision with the least risk. It follows that all possible measures, operative and postoperative, should be taken to reduce the number of mishaps.

I think it most important to resist the temptation to try the Smith-Indian intracapsular extraction, for as Fuchs states (page 997), "The ideal results ob-



taining in successful cases of this method of operating are purchased at the expense of quite a large number of losses." If this is true, and it undoubtedly is, as shown by comparative statistics, extraction in the capsule by the Smith-Indian method under conditions existent in a civilized population is, to my mind, absolutely inexcusable.

Having worked nearly three years in Manila with a native population similar to that in India I am able to believe that, under those conditions, the Smith operation gives the best average visual results. This is true solely because of the fact that but few of the natives will return for the needlings so frequently needed to complete the result by the capsulotomy method.

Another point upon which Smith lays great stress is the absence of dressings for nine days by which time no more will be needed. This, in the capsulotomy method would be pure neglect. Of course he probably figures that, in doing his operation, he has burned his bridges behind him; and if things go wrong, he can do nothing to help. Certainly this is not true of the capsulotomy method, with which if an accident happens, such as prolapse of the iris, something can be done and the case usually saved as an excellent result. I figure that he was practically forced to work out a labor saving technic in self defense. He was a tremendously overworked man and simply could not have found time to handle his cases as we do. Most of us can not excuse an adoption of his method upon that theory; and our patients will return, with but few exceptions, for the necessary needlings.

When the claims of the supporters of the Smith operation are analyzed we arrive at a very peculiar, and unavoidable, conclusion. Practically all who have learned it in India come back and proceed to write and talk about as follows: The Smith method is the best but takes an exceptionally high degree of operative skill, which skill can be acquired only by performing several hundred extractions behind the smoke screen of Smith's famous cigar. The natural inference does not look

good in black and white. Has anyone of those who traveled to India reported in detail his results in the several hundred operated there? If so it has escaped my observation. All I can say is that, if they had more mishaps than later when they have reached the stage of exceptional skill (self confessed), their "sticktoitiveness" is to be admired.

I wish to admit that I have never tried the Smith operation, not feeling justified in attempting a method that, even at its best, does not equal my results by the capsulotomy method.

An advocate of the Smith method, whose statistics will be quoted later, admits loss of vitreous in 13% of his cases but says such loss is of no moment unless excessive. However, a close study of his cases shows that vitreous loss occurred in 7 out of 18 with less than 20/30 while it occurred in only 11 of 88 cases with better than 20/30—quite a percentage difference. The important point is that once a loss starts it is likely to become excessive certainly more so than if it had not started (the "bull" is admitted but left in hopes of hooking something). Pathology teaches that vitreous does not regenerate and that frequently the portion left does not degenerate and cause retinal detachment. Beard in his *Ophthalmic Surgery* (page 530) has the following to say on this subject: "We have often heard eye surgeons declare that they did not mind a moderate loss of vitreous, and we have often seen apparently permanent good sight, etc., in an eye that had lost vitreous in the extraction. Nevertheless it is a dangerous contingency and one most scrupulously to be avoided. Not the least serious nor the least common of its sequelae is extensive detachment of the retina, and this has a way of creeping slowly and stealthily so that months or even years may elapse before the worst comes." Herbert says in his book on *Cataract Extraction* (page 175): "The connection between vitreous loss and retinal detachment is undoubted." Also on page 176 he says, "Among 122 operations complicated by vitreous expulsion there were 28 failures—presumably failures recognized

before discharge from hospital." He further states that the average loss of vitreous is 3 per cent by the capsulotomy method—this from the records of over five thousand operations by three operators. Taking a 13 per cent loss in the Smith method and basing our calculations on Herbert's figures we can figure 115 unnecessary immediate failures in 5,000 operations. The remote failures would probably be several times this.

#### OPERATION PREFERRED.

The operation that appeals to me as offering the best visual and mechanical results with the least risk is the old simple extraction using a full upper half corneal incision with conjunctival flap, a peripheral iridectomy, and the removal of the anterior capsule with Kalt forceps. The Kuhnt bridge conjunctival flap is an additional measure of safety that I am using in practically all of my recent cases. When this is made properly, and stitches placed, an incision can be made at the corneoscleral junction outside the area of corneal epithelium; there is no attached flap to interfere with the making of a neat peripheral iridectomy; in case of imminent or actual vitreous loss the flap can be pulled down over the entire wound to give complete support. Besides these advantages it helps to protect against later infection, prolapse of iris, the ruinous accident of insertion of upper lid under corneal flap, and last, but not least, allows the operator to become acquainted with the patient's action under fire before it is too late. I feel that this flap affords far greater protection than the attached and is well worth the time spent in making it; which, so far as I know, is the only argument against its use. We all admit that the simple extraction is far superior to the combined in its cosmetic and visual results. The fear of iris prolapse has prevented its more universal use. The peripheral iridectomy solves this problem and there are now on record many hundreds of operations with a smaller percentage of prolapses than in the combined method. The theory is that it is aqueous pressure that bulges the iris into the wound and that the peripheral button hole furnishes a sluice way for the aqueous. If the combined effect of atropin an hour before

operation, with that of cocain and adrenalin does not give a good dilatation of the pupil the simple operation is not done, and the combined method is done instead. This for three reasons—to avoid the results of sphincter paresis, to shorten time and to lessen pressure. A fourth reason might be given as the difficulty of securing a large bite of the anterior capsule thru a small pupil.

The lens should be extracted with the very least pressure possible and, needless to say, if pressure less than that required to rupture the zonular ligament is always used vitreous loss will never occur unless an added pressure is caused by squeezing, on the part of the patient. I think full anesthesia is almost certain to prevent this occurrence. Patients very seldom squeeze unless hurt.

In order to lessen the amount and duration of pressure I take the following precautions:—

1. Large corneal incision holding in the corneo-scleral junction and ending with a conjunctival flap.

2. Removal of a large bite from the anterior capsule using the Kalt forceps by preference.

3. In the maneuver of expression the use of a very flexible tortoise shell spatula and the Fisher needle. With the former one can see as well as feel the amount of pressure and I do my best to complete the expression without appreciably bending the spatula. As soon as the edge of the lens appears in the wound the Fisher needle is poked into it and the lens lifted out which still further lessens the pressure both as to time and amount.

**DRESSING.** I simply cover each eye with a thin layer of wet cotton, and build up a thick layer of dry cotton (using wisps) held in place by two narrow strips of adhesive. This serves to keep the lids gently closed without any localized pressure. Over all is placed a wire mask of the type known as the stonecutter's mask. In this way is avoided all chance of pulling on the dressing, such as sometimes happens with the bandage. Moreover, in subsequent dressings there is no need to move the head.

**AFTER TREATMENT.** First dressing not later than 48 hours by which time if things are all right all dressings can be

omitted. The mask is worn for three weeks to prevent opening of the wound by accidental blows. This I think is very important for a certain percentage of eyes are ruined this way and unnecessarily so.

One of the most important advantages of the above technic is the fact that it is a one man operation. The importance of a trained assistant is a great disadvantage in the Smith method.

#### DISCUSSION.

At this place it may be worth while to touch on removal by dissection. Jackson, in a recent paper, has argued in favor of extending the age limit for this operation calling attention to the frequent complete absorption of traumatic cataract even in people around forty. The method is slower but is much safer, and it can be carried along as an office procedure. The patients are thus saved considerable expense and loss of time. In case of excessive swelling with hypertension the lens matter is evacuated thru a small linear incision. The case winds up as a simple extraction as far as appearance is concerned. I am now working on two cases of bilateral congenital cataracts in men of 32 and 37. In each I have finished the first eye, in one obtaining 20/20 plus with a perfect cosmetic result. In the other a perfect cosmetic result was secured but a vision of only 20/150 due to partial atrophy of the nerve, the temporal quadrant being very white. In both the media are beautifully clear and of course there is no more corneal astigmatism than before operation.

When to operate. Whenever the patient is disabled is the time to operate. A one sided cataract should be operated as soon as the field of vision is abolished in order to avoid a blind side with its dangers. There is no need to wait for maturity. To help us with immature cataracts we now have the Homer Smith preparatory capsulotomy. Soft cortex usually absorbs, and if a large corneal incision is used there is a better chance of removing more of the cortex with the nucleus. The claim that the Smith-Indian method is the only one for immature cataracts is therefore false.

#### RESULTS.

A mechanical procedure should be judged by its mechanical results. In the case of cataract extraction this is fair, because the visual result will be good in proportion to the mechanical, provided the perceptive apparatus is normal and the other media clear. Sometimes good visual results occur with bad mechanical, as in the "very updrawn pupil" of the Smith method. We should always try to locate complications in the other media and in the perceptive circuit in order to warn the patient as to possible visual failure. Sometimes it is worth while to operate on such cases merely to obtain peripheral vision and so enable them to find their way about with greater ease. To be on the safe side I always inform my patients that mechanical failure occurs, on an average, in about one out of every twenty cases and that such failure is due usually to misbehavior on the part of the patient or to some unpreventable incident during convalescence, such as sneezing or vomiting. I do not care to operate on anyone who will not take a 20 to 1 chance.

#### COMPARATIVE STATISTICS.

Because it is the only paper that gives us the results in a series of uncomplicated cases together with an honest notation of all the mishaps occurring during and after operation I have chosen that by the Drs. Green of San Francisco, read before the Ophthalmological section of the A. M. A. in 1917. I am paralleling their 106 cases with 40, but to prove that I am not juggling my records I also include a detailed account of all my unfinished and complicated cases. This number, 60 in all, includes all since I started to practice in California five years ago. Practically all my cataract work prior to that was in Manila under conditions where accurate records are impossible. I doubt if any operator by the Smith method can equal my results even from the standpoint of vision, certainly not from that of freedom from mishaps, operative and postoperative. They also show that even the infrequent operator may expect excellent results if he has surgical sense, a light hand and will use "safety first" precautions.

**UNFINISHED CASES.**—Eight (one mishap).—Only two of these were refracted and both had membranes. Both refused needlings being satisfied with vision afforded by my extractions on the fellow eye (20/20 and 20/30). The other six never returned for refraction and needlings. All but one had perfect mechanical results. The one exception got out of bed the night of the operation and bumped his way about the ward with both eyes occluded. This resulted in a full opening of the wound, complete iris prolapse and buckling of the cornea. The protrusion was covered in with a wide Kuhnt flap and healed without infection, but of course with incarceration. Pressure bandages rounded the cornea and he wound up with a clear black pupil well down that permitted a beautiful view of the disc. He could count fingers easily at 10 feet without glasses and I believe would have corrected to 20/30.

**COMPLICATED CASES.**—Twelve (two mishaps).—1. Two extractions, high myopia in each eye with fundus changes. Vision without lenses 20/50 and 20/70. Iris prolapse in one eye from attack of vomiting the morning after operation. This incarcerated but there was a good black pupil and this eye had the better visual result.

2. Vitreous opacities and myopic macular changes. Vision 20/40 thru faint membrane, needling of which she refused. Other eye had same condition but needling gave vision 20/30 and case is included in list of uncomplicated cases.

3. Traumatic cataract dislocated into the vitreous. Luckily it was anchored to the iris by a fine adhesion. Removed without vitreous loss. Beautiful mechanical result; but only a peripheral field because of numerous macular retino-choroidal ruptures. He was satisfied to be rid of the blind side.

4. High myopia. Large white posterior staphyloma. Peripheral vision only. Media perfectly clear, and fundus details focus without lens.

5. Traumatic cataract with fluid vitreous. Many years standing. He was a beggar and operation was done partly in hopes of enabling him to see street intersections (other eye blind), but chiefly to get him out of the cold world during

Christmas holidays. Both "objectives were attained."

6. Two extractions both giving perfect mechanical results. Both corneas hazy from trichiasis. Unable to read but is satisfied to see to get about.

7. Two extractions with vision of 20/30 and 20/40 the reduction being due to corneal haze from old trachoma. Able to read fine print.

8. An unruly patient. From experience with his other eye I foresaw the possibility of vitreous loss; and prepared a Kuhnt flap in advance with sutures placed. Lens was extracted without trouble but during toilet he squeezed, extruding a bead of vitreous and the iris which later incarcerated. Wound up with nice black pupil and had vision of 20/50 at three months, with plus cyl. 5. Final result unknown as he died shortly after from heart failure. There were extensive myopic changes in fundus.

9. A traumatic cataract with piece of steel retained in eye and siderosis. The steel has been in the eye undiagnosed for 18 months. My idea was to remove the lens in hopes of being able later to remove steel thru the pupil. This, however, was not successful at the first attempt. The eye began to clear up and in a month the nerve head could be seen hazily, the vision corrected to 8/100 and of course the blind side was abolished. At this stage he disappeared.

#### SUMMARY OF UNCOMPLICATED CASES.

Vision 20/15, 12 (30%); 20/20, 17 (42.5%); 20/25, 2 (5%); 20/30, 8 (20%); 20/60, 1. Total 40=97.5% 20/30 or better.

The two cases of 20/25 were in the same person who was a diabetic, this being the vision a year after operation, and after the subsidence of an attack of acute hemorrhagic retinitis.

Five of the 20/30 cases had faint pupillary membranes in which the vision could have been improved by needlings and thus added to the 20/20 list; one of this list had myopic macular changes and vitreous opacities.

The case listed as 20/60 had this on the 14th day about which time a low grade cyclitis with vitreous haze developed. The operation and its immediate result had been perfect. She disappeared from treatment and I can-



not give the final result but it was probably bad. The cause might have been a focal infection.

**MECHANICAL MISHAPS**, 4 in number, all prolapses, 10%. Two were excised and replaced. Another was large and due to gross misbehavior on part of patient. However all wound up with 20/20 or better. So no permanent harm was done.

#### Summary of Greens' Uncomplicated Cases.

20/15, 40 (37.7%); 20/20, 24 (22.6%); 20/25, 9 (8.5%); 20/30, 15 (14.1%); 20/40, 6 (5.5%); 20/60, 4 (3.7%); 20/80, 1; 20/100, 3; 20/120, 1; 20/200, 1; 10/200, 1; 1/200, 1. Total 106, 82.9%, 20/30 or better.

#### Mishaps.

A. Among cases giving better than 20/30 (88 in number).

1. Vitreous loss in eleven cases.
2. Prolapse of iris in six.

3. Incarceration of iris in one.

4. Secondary iridectomy for updrawn pupil in six.

5. Secondary operation for ruptured capsule in two.

6. Updrawn pupil in three.

7. Capsule rupture in five.

B. Among cases giving less than 20/30 (18 in number).

1. Vitreous loss in seven.

2. Pupil drawn up in two.

3. Capsule rupture in two.

4. Iris prolapse and glaucoma later in one.

5. Iris adherent to wound and glaucoma later, in one.

6. Pupillary exudate in one.

Altogether about 45% of serious mishaps, in 18 cases, reducing the vision in varying degrees from 20/40 to 1/200. Compare this with my 10% of mishaps all of which finally wound up with 20/20 or better.

#### My Uncomplicated Cases (40 Completed).

97.5% with 20/30 and better which includes three cases with macular disease, two of which were diabetic, the other myopic with vitreous opacities.

Accidents. None at operation. Four iris prolapses found at first dressing. In one of these a peripheral iridectomy with replacement and two complete excisions gave as perfect results as the primary. The other wound up with incarceration. All had 20/20 or better.

A total of four operative mishaps only one of which wound up as a bad mechanical but even this one gave a visual result of 20/20.

Five of the 8 cases listed as 20/30 had faint membranes, the needling of which would have moved them into the 20/20 or better class.

Vision.	No.	%
20/15	12	30.
20/20	17	42.5
20/25	2	5
20/30	8	20
20/60	1	2.5
40	100	

#### Greens' 106 Uncomplicated Cases.

82.9% with 20/30 or better. In the 88 cases with better than 20/30 the following mishaps occurred:—vitreous loss 11, prolapse of iris 6, incarceration iris 1, updrawn pupil 3, rupture capsule (technical failure) 5, secondary iridectomy 6, secondary operation to remove capsule 2. Total 34 = 38.6%.

Updrawn pupil in 2, vitreous loss 2, iri prolapse 1, not stated in 2 (one duplication).	20/15	40	82.9
Vitreous loss 3, capsule rupture (failure) 1	20/20	24	
Capsule rupture (failure) 1.	20/25	9	
Visual test not satisfactory 1 (mental defective), iris prolapse and glaucoma 1, large vitreous loss 1.	20/30	15	
Iritis and chronic uveitis. Broken point of knife in eye.	20/40	6	5.5
Large vitreous loss—patient unruly.	20/60	4	5.5
Pupillary exudate—noninflammatory.	20/80	1	
Adhesion of iris to wound and secondary glaucoma	20/100	3	
	20/120	1	
	20/200	1	
	10/200	1	
	1/200	1	



Fisher, of Chicago, reports 94 intracapsular extractions with following results: 20/20, 56 (60%); 20/20 to 20/40, 12 (12.5%); 20/40 to 20/65, 9 (9%); 20/65 to 20/100, 9 (9.5%); 20/100, 5 (5.3%); eyes lost 3 (3.2%).

He gives the following as the cause of the poor results: iridocyclitis in 3, glaucoma in 4, ruptured capsule (failure) in 3, detached choroid in 1, hemorrhage of choroid in 1, drawn up pupil in 1, detached retina in 1; a total of 14 serious mishaps in 94 cases without mention of vitreous losses.

Where is the sense of humor of an individual who can recite such a list of mishaps as those listed above by both Fisher and the Greens, and then state that the method responsible for them is the best?

I would like to conclude this paper by quoting in full Beard's idea of the status of the Smith operation as given

in his *Ophthalmic Surgery* (pages 573 to 576). But to save time I will merely refer to that, and quote the last paragraph. "When the time arrives that the average operator can rid the eye at once of cataract, subcapsular cortex, and capsule with as little ultimate damage to the integrity of the organ as it now incurs from the best chosen of other methods, ophthalmic surgery will have made an enormous step in advance. That such a time has not arrived no one can deny, and few perhaps are so optimistic as to believe that it is near."

A grand total of 51 mishaps in cases listed and considered before operation to be uncomplicated. Only one stated as being in an unruly patient. Their record betters mine only in the percentage of 20/15 cases but it is quite apparent that this unimportant gain was "purchased at the expense of a large number of losses."

## A CASE OF INTRAOCULAR SARCOMA WITH UNUSUAL OPERATIVE HISTORY

EDWARD C. ELLETT, M.D.

MEMPHIS, TENN.

The case here reported and others referred to illustrate the importance and difficulties of the diagnosis of intraocular tumors. Read before the American Ophthalmological Society, June 1920.

Mrs. M., aged 52, was referred to me in February, 1917, by Dr. H. T. Collier, of McKenzie, Tenn., for an affection of the right eye. Six months before that time, namely in October, 1916, the vision in the right eye began to fail and the field of vision to contract, until she could see objects only in the lower temporal field. There were no other symptoms referable to the eye until ten days before I saw her, when the eye became totally blind, red and painful. During this time, especially for the last month, she had not been well otherwise, the symptoms being referable to the abdomen, but her physician and consultants had not been able to find any definite pathologic condition.

The left eye was found to be normal in every way except for 1.50 D. of hy-

peropia, the correction of which gave her normal vision. The right eye was blind, greatly inflamed and painful, the pupil widely dilated, the anterior chamber shallow, and a grayish reflex was obtained from the vitreous, no red reflex being seen and no details of the eye ground being made out. Transillumination of the eye was not practiced. The tension was plus two. With the McLean tonometer the tension was between 90 and 100, and with the Schiötz, 57. In other words the eye presented all the signs of acute glaucoma.

On account of previous experiences, two of which will be presently related, I was suspicious of the eye, and was unable to banish from my mind the possibility of intraocular tumor. I expressed this fear to the patient's hus-

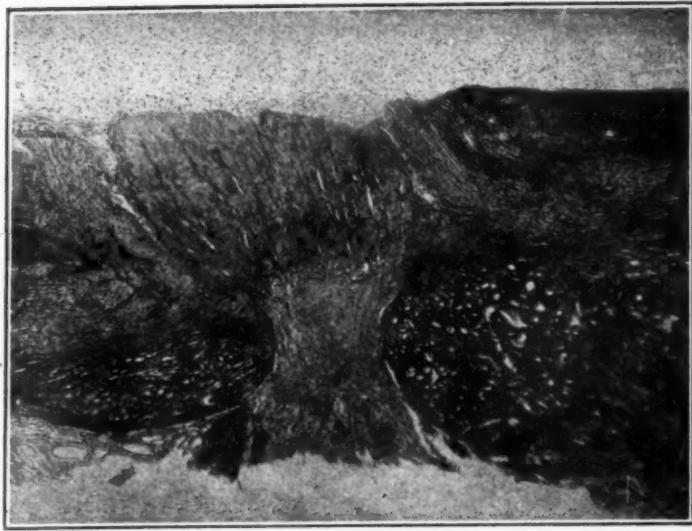


Fig. 1—Section passing thru the nerve head and showing the tumor mass on each side, but not involving the nerve.

band, but advised operation for the glaucoma. This was agreed to, and on the following day a corneoscleral trephining, with iridectomy, was done, under local anesthesia. The operation was very painful, but technically satisfactory, and the dressing was applied with the eye looking as it should in every respect. There was no special

complaint during the ensuing twenty-four hours, but on removing the dressing the next morning a large smooth dark mass was seen to protrude from the trephine opening. It was approximately spherical, and about 10 mm. in diameter. It had pushed the conjunctival flap down on the cornea, and could be seen to protrude from the

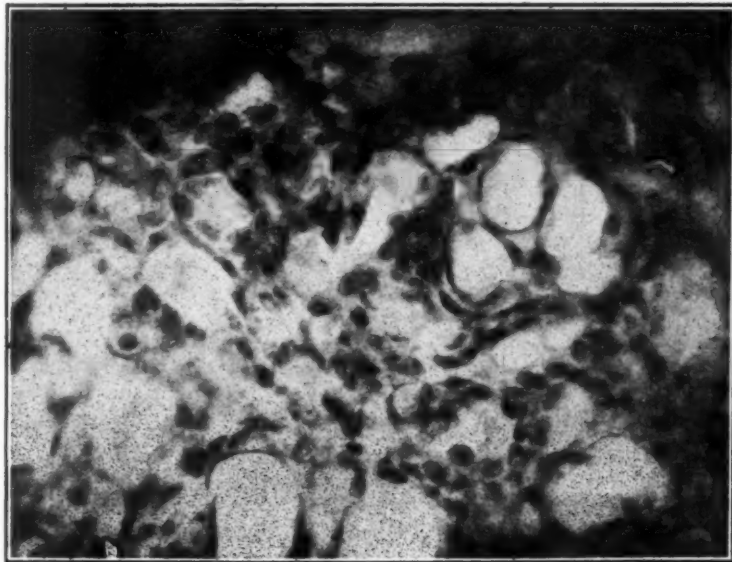


Fig. 2—Microphotograph of tumor.

trephine opening. It was large enough to have contained the lens, and seemed to be covered with the iris and choroid. The suspicion of intraocular tumor was now so strong that removal of the eye was advised and practiced. The recovery was prompt, tho the patient continued to feel sick and weak from symptoms which she referred to her stomach. Further examination at this time by an internist, did not disclose the cause. She soon returned home,

The size of the tumor was such, taken in connection with its location, that transillumination by the ordinary methods would not have suggested its presence, tho the small light suggested by Dr. Allen Greenwood to be introduced into the orbital tissues behind the ball, might have given some assistance.

The two previous experiences referred to above are the following. Many years ago, while House Surgeon



Fig. 3—Section passing thru the trephine opening. The conjunctival flap is seen pushed up at right angles to the cornea. Retina and vitreous pass thru the opening. Lens in position, but suspensory ligament is pulled toward the opening.

and died the following summer. I do not know the exact cause of death, but was told she had some form of abdominal growth.

The eye was divided equatorially, and each half was divided anteroposteriorly. At the posterior pole of the eye, surrounding the optic nerve and lying mostly to its lower and inner side, was a new growth, about 7x11 mm. in extent, and 3 mm. thick. The retina was totally detached and not connected with the growth. Sections of the growth showed it to be a slightly pigmented sarcoma. In the anterior half of the eye the trephine opening was well seen, and thru it had prolapsed parts of the retina and vitreous. These conditions are all well shown in the illustrations.

at the Will's Eye Hospital, my colleague, Dr. W. R. Parker, and I undertook to work up some of the pathologic specimens that had accumulated in the museum. Among other eyes, we found one of a woman, aged 50, with the history that she had awakened with a feeling as if something had given way in the eye. The eye protruded slightly, was stony hard, and there was a marked iridocyclitis and a tendency to scleral staphyloma in the temporal portion of the ball. The diagnosis was "Absolute Glaucoma." Sections of the eye showed a round celled sarcoma of the choroid.

About ten years ago, one of my associates did an iridectomy for acute glaucoma in an eye that had been blind for two years, but had not been seen

by him until the acute attack appeared. His diagnosis was "acute glaucoma in an eye blind from chronic glaucoma." The wound did not heal, but its edges continued to pout and the anterior chamber did not reform. I saw the patient after this state of affairs had lasted two or three weeks, and it seemed to me that something must be pushing the lens and iris forward, and

examination or from reports of previous examinations by others, what was the cause of the blindness. It is accepted, and stated in standard text books, that simple glaucoma often passes into inflammatory glaucoma, but when my attention was called to the matter I was not sure that I could certainly recall a case in which I had seen this occur. Inquiry among others



Fig. 4—Angle of the anterior chamber opposite the trephine wound.

that this something was most apt to be a growth. The vision, tested at this examination for the first time, was found to be reduced in the fellow eye, but normal with a—1.00 D. lens. Two days later the vision was worse, the pupil small, and tho there was no redness or pain in the eye, it was impossible to dilate the pupil with atropin. In short, there was a sympathetic ophthalmia, which prompt removal of the operated eye did not arrest, and the eye went on to blindness. The enucleated eye was found to contain a tumor.

Such experiences make one very suspicious of acute glaucoma in eyes that are already blind, at least in those in which we cannot say, from previous

showed that many had the same to say, but since looking for them I have found several such cases, some in which the sight was lost before the attack of acute glaucoma, and some in which it was not. My own limited experience, therefore, confirms the prevailing idea that acute glaucoma can and does develop in eyes which are the seat of a chronic inflammatory glaucoma. Nevertheless, in acute glaucoma in eyes that were previously blind from an unknown cause, the possibility, even the probability, of intraocular tumor as a cause must not be lost sight of, and the safest plan in such a case is to enucleate the eye.



## VISUAL FIELD FINDINGS IN A CASE OF BRAIN TUMOR

WALTER R. PARKER, B.S., M.D.

DETROIT, MICH.

The progressive changes shown in the visual fields of this case are of especial interest in connection with the post mortem examination showing the location of the tumor that caused them. Read before the American Ophthalmological Society June, 1920.

The visual field charts here shown were taken from the records of a case of brain tumor involving the left optic tract, the chiasm, and the adjacent brain substance.

CASE. A brief outline of the history is as follows: J. M., aged 28, first came under observation in 1911. At first a

1911, the vision in the right eye was 6/15; left eye 6/12. Pupillary reaction was present, but somewhat sluggish, especially in the right eye. Wernicke's sign present.

Ophthalmoscopic examination showed edema of both optic discs, most marked in the right. No measurable swelling

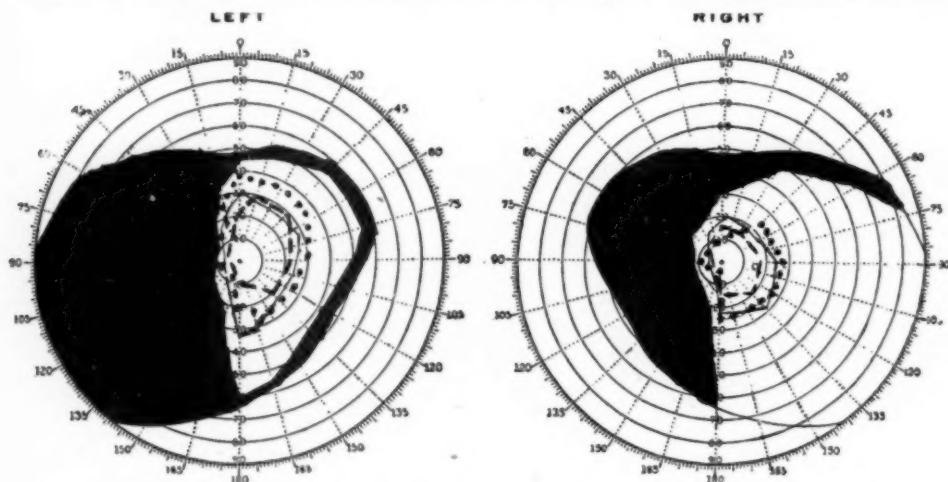


Fig. 1—Fields of vision, May 5, 1911. Boundaries of color field: red, dotted line; green, broken line; blue, continuous line.

private patient, later in Ophthalmic Clinic at University of Michigan. He was a sailor on the Great Lakes and was sent home on account of inattention and inability to keep awake when on watch. There was nothing in his family history of importance and his personal history was negative until the time of onset of his present disease. Four years previous to the time of the first examination he suffered attack of headaches, general in character, but not severe. About two years later the pain in the head increased in severity and frequency and was often accompanied by nausea and vomiting, with occasional brief attacks of vertigo and falling sensation. He never complained of loss of vision. When first seen in

present. Visual fields showed an homonymous hemianopsia, without involvement of the macula.

The headaches did not increase in severity while the patient was under observation until within a few months before his death but the mental and motor disturbance gradually became more marked. The patient had a sense of well being and often insisted he could go back to his ship and do his work "if only he could see." Later he developed a left limb and acromegaly with other symptoms of hyperpituitarism.

At the time of the onset of the symptoms referable to involvement of the pituitary gland, Dr. R. B. Canfield did a sellar decompression operation by



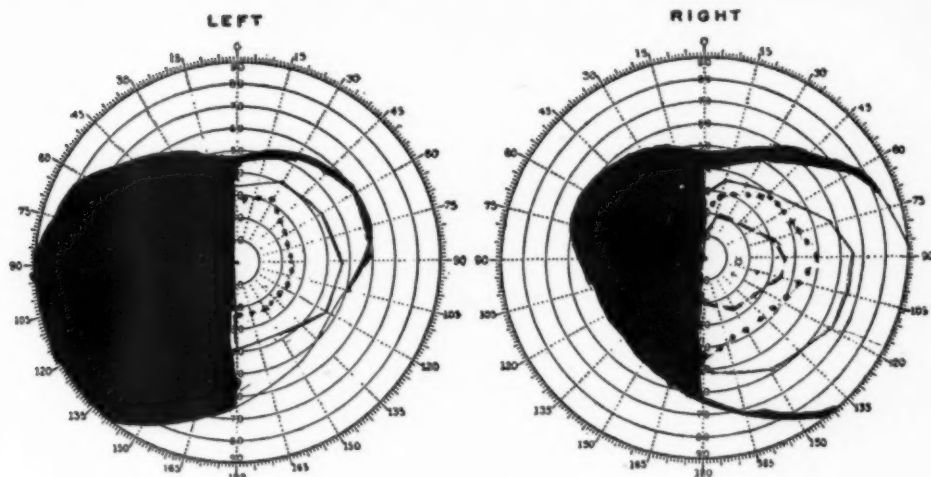


Fig. 2—Fields of vision, December 12, 1912. Color fields as in Fig. 1.

the transsphenoidal route. A portion of the tumor was removed and submitted to pathologic examination by Dr. A. S. Warthin who reported the tumor to be a large round celled sarcoma.

As the gland lost its functioning power due to the invasion of the tumor, symptoms of hypopituitarism succeeded those of oversecretion of the gland. These changes became noticeable shortly after the sellar decompression operation.

The patient died April, 1914. Post mortem examination revealed a large

tumor involving the right tract, chiasm, and adjacent brain substance. Pathologic report: Large round celled sarcoma with numerous calcareous concretions (psammoma). Growth probably primary in the meninges.

The visual fields were of particular interest, showing at first an homonymous hemianopsia without involvement of macular region. Vision O.D. 6/15; O.S. 6/12 (Fig. 1). Later the macula became involved. Vision right eye 1/60; left eye 5/30 (Fig. 2). Still later there was a loss of green perception in the right eye with a marked

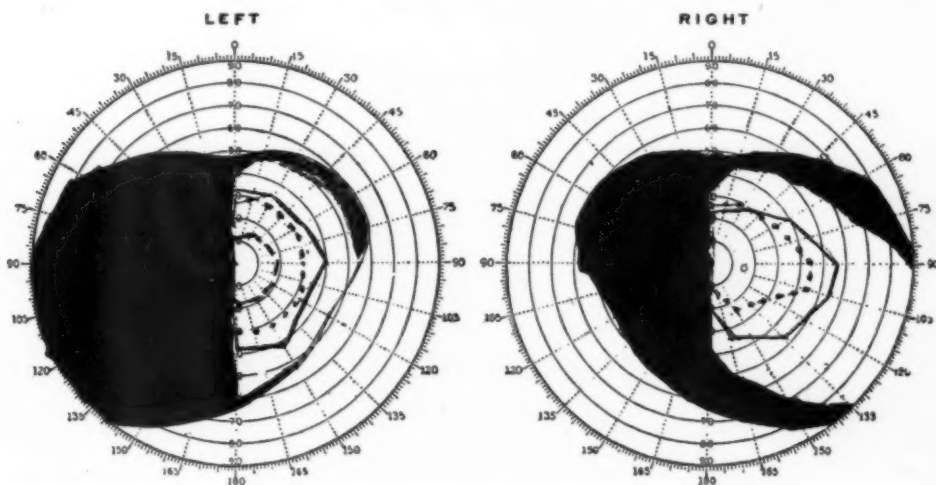


Fig. 3—Fields of vision, February 26, 1913. Color fields as in Fig. 1.

contraction of the temporal form field (Fig. 3). This condition in time was followed by loss of all color sense in the right eye with more marked temporal contraction for form. Vision,

jerk markedly exaggerated, slight memory defect. Wassermann negative; urine negative.

DISCUSSION. To produce the field changes here shown the tumor ap-

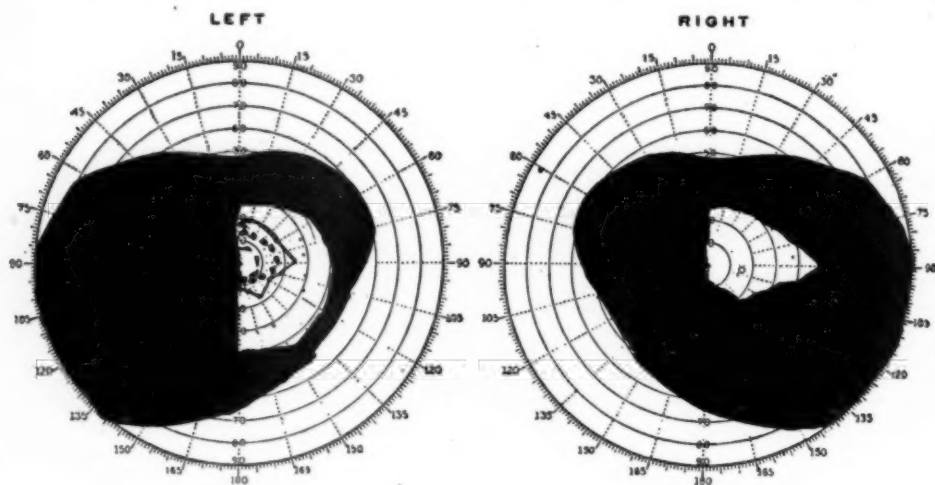


Fig. 4.—Fields of vision, October 24, 1914. Color fields for left as in Fig. 1

fingers at 2 feet (Fig. 4). Finally total blindness in the right eye (field not taken).

The optic disc in each eye at first edematous, with no measurable swelling, gradually paled, and finally became atrophic thruout. The neural examination made by Dr. C. D. Camp, March 11, 1912, showed general muscular weakness, slight difficulty in turning to the right, no nystagmus, power of convergence normal, slight facial paralysis, positive Romberg, knee

parently first involved the right tract, inducing a left homonymous hemianopsia and a positive Wernicke sign. Later it either invaded the chiasm or led to pressure symptoms that affected only the papillomacular bundle causing loss of central vision.

Finally a possible bitemporal hemianopsia developed and this superimposed on an homonymous hemianopsia led to blindness in one eye (right) and loss of temporal field in the other.

## SAFETY PROCEDURES IN THE OPERATION OF SENILE CATARACT.

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This paper gives certain practical measures for avoiding dangers that beset cataract extraction. It especially emphasizes the value of complete anesthesia; and of leaving a bridge of tissue in the corneal incision until the speculum is withdrawn, when it may be divided with the scissors. Read before the Colorado Congress of Ophthalmology and Otolaryngology, July 23, 1920.

During the operation of cataract extraction, prolapse of vitreous may occur at any stage after the beginning of the incision. Minimize the importance of this occurrence if you will, it is nevertheless one of the most dreaded complications of this operation, for it may mean the loss of the eye. Frequently it means greatly reduced vision thru permanent opacities in the vitreous chamber. Often the pupil is drawn upward on account of retraction of the iris. Also the more serious complications of retinal detachment, choroidal hemorrhage and irido-cyclitis may accompany or follow the accident.

The most frequent cause of prolapse is pressure by the operator or by the patient; the vitreous escaping either with the lens or immediately after. It may occur as soon as the section is completed from contraction of the orbicularis or recti muscles. There may be complicating conditions from disease or injury which has caused atrophy or rupture of the zonula.

Much has been written regarding the character of the section; and of various instruments, as eye specula and lid retractors, by which the frequency of the occurrence may be lessened. I believe I have seen it occur more frequently from insufficient anesthesia than any other one cause. I well remember seeing one of the chief promoters of the intracapsular method lose vitreous in two cases out of four operations in one afternoon, in his own operating room and with his own trained assistant. I am quite sure it was due to insufficient anesthesia primarily, altho the method itself increased the hazard.

So much has been said about the effect of cocain upon the corneal epithelium that operators may and do err on the side of using too little rather than too much. It is pain, sudden and acute

pain, which causes the patient to "squeeze" his eye.

Another promoter of this operation in this country following the practice of Col. Smith, used and advised one drop only of a two per cent solution of cocain. He has long since abandoned this practice and now uses a subconjunctival injection of cocain for anesthesia in addition to its instillation into the conjunctival sac.

Inexperienced operators are apt to make too small an incision. This is of no serious consequence if the operator recognizes the cause of the failure of lens to present and enlarges the incision with the scissors. I have seen vitreous prolapse brought about by the persistent attempt of the operator to extract a lens thru an insufficient opening. There is no need in this country of using dull instruments. I believe Col. Smith does one hundred operations with the same knife. The traction on the eye ball is in direct proportion to the dullness of the knife. The zonula may be easily ruptured by the traction caused by dull instruments. It is better to have a fresh knife for each operation. This is of more importance than the particular shape which may be advocated by various operators.

Vitreous is occasionally lost after the operation is completed and the operator attempts to remove a blood clot from the wound. This is one of the most regrettable accidents because it is so unnecessary. I have known this to happen to two of the most skilled operators. One was using a cotton sponge to wipe the blood from a conjunctival sac and the other was using forceps. In both these cases, after very slow recovery vision of only twenty two-hundredths was obtained on account of the opacities in the vitre-

ous, which followed. In these cases, the speculum should have been out or the patient should have been told that the eye was to be touched.

Some operators believe it to be good practice to cut off the eye lashes. At the Illinois Charitable Eye and Ear Infirmary, someone started this practice and it was followed with my cases until I had this experience: I was operating upon a woman who could neither speak nor understand English, neither could an interpreter be found. I find the eye lashes are very useful to serve as a handle. The lid can be picked up and drawn over the corneal flap. In this case after the extraction was done and the speculum removed, the lid brushed down into the wound. The patient kept opening and closing the eye and with every movement there was a continuous prolapse of vitreous. With the lashes present, the lid could have been held over the eye until the patient could have been made to understand that she was to keep the lids closed.

In November of last year, a man of 76 was brought to the Illinois Eye and Ear Infirmary with double senile cataract. His general physical condition was good; but his mental condition was poor. He was in the early stages of senile dementia. One could gain his attention by talking to him; but his mind would wander from a subject very quickly. His son was made acquainted with the danger of operating upon a patient in his mental condition; but was of the opinion that it was worth while to make the attempt, an opinion with which I concurred and which the after results showed were wise. When I arrived at the hospital on the day of the operation, the male attendant, who has been long in the service and who exercises the privilege of free speech, often accorded such faithful employees, "hoped that I would not operate."

The patient had been out of bed wandering over the hospital not knowing where he was. The stage was well prepared to save the nurses and attendants this additional care, which a

crazy man with a freshly operated eye would give them.

I am not relating this case to argue especially in favor of operating all such cases and was hesitating myself, as many of you have done in the same situation. So I asked the intern if I should operate or not. His reply was characteristic: "If you wish to allow the attendant to dictate what to do with your patients, don't operate." I replied "We will operate." Anesthesia was secured by a ten per cent solution of cocain. The puncture and counter-puncture were made and the incision begun when the patient began to lose control of himself and started to "squeeze the lids." He would stop when spoken to and began again as the cutting was resumed. Realizing we were in for a vitreous prolapse if we kept on, I withdrew the knife before the incision was quite completed, leaving a scleral bridge of perhaps 3 or 4 mm. in length. At this time I did not know any more than my audience did, how I would complete the operation; but I did feel that the patient would expel the contents of the eye ball if he could; and I did not intend to give him the opportunity. The speculum was removed, a few more drops of cocain solution instilled and after waiting a few moments, the lids were slightly separated with the fingers and the incision completed with the scissors. We have at the infirmary, scissors designed for the purpose of enlarging a corneal incision if made too small but a pair of Stevens' curved tenotomy scissors will answer the purpose.

Iridectomy was performed and capsulotomy also without the use of speculum or retraction. The lens was expelled by pressure of the fingers on the lids. This patient made an uneventful recovery and his mental condition was very much improved so that everybody concerned was delighted with the results.

It occurred to me that if this procedure of temporarily leaving a sclero-corneal bridge would help to guard against vitreous prolapse from fault of the patient, it might also be useful in



cases where the zonula was known to be ruptured as in dislocated lenses, traumatic cataracts, diseased fluid vitreous, etc.

A. P., a private patient, 57 years of age, presented himself with a luxated cataract. Two years before he had been struck in the left eye with a piece of wood. Vision had very gradually failed; but he had been blind only about three weeks before he came for an examination. The anterior chamber was shallow and the iris tremulous. It was not until the pupil was dilated that it could be plainly seen that the lens was luxated to the temporal side. Knowing that vitreous prolapse would certainly follow the ordinary incision, I followed the method used in the previous case and succeeded in completing the incision without any loss of vitreous. The iridectomy was performed with very slight loss and the lens extracted with the wire loop with a slightly increased amount of loss. Vision of 6/12 was obtained with  $+9 + 1.00c.$  ax. 180.

I believe this method of making the incision is the acme of precaution in guarding against vitreous loss and

shall advise it and follow it in these two types of cases.

#### Conclusions:

1. Vitreous prolapse is less apt to occur if anesthesia is thoro. Use enough cocain rather than too little. Softening of the corneal epithelium is of little consequence compared with vitreous prolapse.
2. Incision must be large enough so that moderate pressure causes the lens to present. The incision is easily enlarged with scissors if originally made too small.
3. The knife must be as sharp as possible to avoid unnecessary traction on the eye.
4. After the operation is completed, do not touch the eye without a word of caution to the patient and better have the speculum removed.
5. Do not allow the cilia to be removed.
6. In cases where vitreous prolapse is a probability, either from lack of self control on the part of the patient or from diseased conditions in the eye itself, do not immediately complete the corneal section with the knife; but remove the speculum and complete the incision with the scissors.

## DELIRIUM FOLLOWING CATARACT AND OTHER EYE OPERATIONS.

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After reviewing the literature of this subject a summary is given of what it contains regarding etiology and treatment. The author's recent cases are mentioned with details of one of them, and conclusions drawn from the study and experience. Read before the Colorado Congress of Ophthalmology and Oto-Laryngology, July 23, 1920.

**LITERATURE.** Altho it has been known since the middle of the 17th century that delirium followed certain surgical operations, Dupuytren<sup>1</sup> in 1819, was the first to direct attention to the special delirium following cataract operations. In his clinical lectures on cataract, he reported that in twenty-one cases he had observed nervous delirium in two of them. The symptoms disappeared in a few days after the use of antispasmodics. The delirium was distinct from delirium tremens.

Since Dupuytren's paper was published (just 100 years ago), twenty-nine other papers on this subject have been recorded. In 1863 (59 years after the first recorded case) Sichel<sup>2</sup> reported eight cases, all in old people, and described the condition as a febrile delirium due to closure of the lids and loneliness. Magne<sup>3</sup> and Lanne<sup>4</sup> also described some cases in 1863. Magne thought the condition was due to diet changes causing stomach trouble. Warlomont<sup>5</sup> in 1865 described a case in which the patient tore off the ban-

dages without relieving the delirium. In this case he observed that the delirium which was absent during the day returned at night, despite the presence of light in the room. Arlt<sup>6</sup> in Graefe-Saemisch's Handbook, 1874, wrote: "In old patients, much run down and nervous, mental disturbances may occur during the few days following operation." He advocated uncovering the unoperated eye.

Schmidt-Rimpler<sup>7</sup> was the first to try to explain this phenomenon. In 1878 he reported two cases: a woman of fifty-seven years with iritis and a young man of nineteen years with iridochorioiditis, operated by iridectomy. He tried to ascribe the delirium to the darkness resulting from the dressings and the retention of the patients in a dark room. He thinks that in a human being blinded (temporarily or not) ideas can arise, not attenuated or corrected by the sight, which will provoke superexcitation bordering on hallucination. He also showed that such psychoses can develop without operation when the eyes are bandaged and the patient kept in a dark room. When the eyes are closed to outward impressions a sort of dream life is experienced. Since both patients were alcoholic, he believes that predisposition is an exciting cause.

Schnabel in 1878<sup>8</sup> first laid emphasis on the factor of senility since all the cases up till then were patients averaging around seventy years of age. He attributed the delirium to circulation disturbances involving brains atrophied by senility. He had seen twelve cases of delirium in 183 cataract operations from 1877 to 1880 in the Innsbrück Clinic.

Hirschberg<sup>9</sup> reported a case in a man of sixty-seven years operated by iridectomy for glaucoma of the right eye. Twelve days later he showed symptoms of delirium. Despite removal of the bandages the patient could not sleep and the delirium continued. It recurred the following day but less violently, and the next day he regained his reason, but did not remember anything of the crisis. Hirschberg thinks that deprivation of the sense of vision

and derived impressions starts the delirium. Kretschmer<sup>10</sup> and Landesberg<sup>11</sup> reported five cases between them about this time.

Webster<sup>12</sup> reported a case of meningitis and death following cataract extraction. The patient was a man aged seventy-six years, who had lost the sight of his right eye nine years before by injury, his left eye now operated for black cataract. "The patient developed a condition akin to dementia on the second day, chemosis on the fourth day, well marked panophthalmia on the eighth day, vomiting with loss of power over his sphincters on twelfth day, and died on the twentieth day after operation. The diagnosis of meningitis was confirmed by a member of the Neurological Staff who saw the patient."

Parinaud<sup>13</sup> reported three cases in 1890. He gives these explanations: (1) the preoccupation of the patient during the days preceding the operation; (2) occlusion of the eyes, which by isolating the patient from external ideas puts him in a condition favorable to delirium; (3) the regime to which the patient is submitted. In his own case neither alcoholism nor atropin could be incriminated.

Frankl-Hochwart,<sup>14</sup> attributed the delirium to the fear of losing the eyesight. Martin<sup>15</sup> doubted this and said: "The delirium of the operated is a nervous delirium, its predisposing cause being an alcoholism, and its occasional cause being the deprivation of drink." Frankl-Hochwart recognized four groups. (1) Hallucinatory insanity in nonalcoholics; (2) simple mental confusion in senile patients; (3) delirium in alcoholics; (4) inanition confusion in very reduced individuals. Valude<sup>16</sup> reported a case in which after forty-eight hours of delirium the patient became normal after the removal of his bandages.

Berry<sup>17</sup> reported an epileptic seizure after cataract extraction in a woman of seventy-two years. There was no previous or subsequent history of epileptiform seizures; there was, however, heavy hemorrhage from the operation. He had seen three cases of delirium

after cataract extraction; one the result of atropin poisoning; in the others, no apparent cause. In 1896 Lowy<sup>18</sup> reviewed the literature and reported a case of his own in which he believed senility to be the principal factor in the delirium.

Posey,<sup>19</sup> in 1900, reported twenty-four cases, nineteen after removal of cataract, three after iridectomy, two after extensive eye injuries. He believes that the cause is principally physical, and recommends chloral and bromides in the treatment of delirium. In the discussion of this paper many cases were mentioned and the treatment recommended was the removal of the bandage from the unoperated eye and getting the patient out of bed.

Fromaget<sup>20</sup> attributed the delirium to intoxication and quoted literature in support of the view that post operative delirium in other operations is due to intoxication. In two cases operated by him for cataract the delirium was present at night only. He believes the intoxication is an autointoxication due to disturbances in the emunctory function and retention of urea. The changes in occupation and diet, medication, etc., the emotion accompanying the operation, all tend to weaken the already debilitated eliminative powers of the aged. Since cataract operations are generally performed on the old, he concludes that the delirium is due to autointoxication, which is a product of senility. Postoperative deliriums are the deliriums of dreams. Tho in itself not a cause, occlusion of the eyes puts the patient in a state of hypnosis and is conducive to sleep or pseudo sleep. This state, plus the stirred imagination attendant upon the operation, incites to dreams and delirium. He does not think that postoperative delirium is always autotoxic, but in ophthalmology he believes it is almost always so.

Kipp<sup>21</sup> reported twelve cases in 1903, of which two were very transient. All the cases occurred after surgical operations or accidental traumatism of the eye. They all occurred in the wards of eye hospitals. Some patients occupied dark rooms, but were mostly

treated in well lighted rooms, with other inmates. Some were sitting up or walking about, and only one of these had both eyes bandaged when the delirium commenced. The majority of the patients were over fifty years old, all were mentally sound on admission and in good general health. In the large majority atropin had been instilled several times daily. Recovery from the mental trouble resulted very speedily in all cases, in which the patients could be returned to their homes immediately after the outbreak. He, therefore, thinks that the psychoses were the result of a change in the patients' environment and a longing to get away from hospital surroundings. He believes it is a nostalgia ending in melancholia.

Finlay<sup>22</sup> reports a case of violent delirium on the night of operation in a woman of sixty-six years operated for mature senile cataracts in both eyes. Urinary examination of this patient revealed uremia, which was taken to be the cause of the delirium. There was no question of a dark room, atropin was not used and homesickness was excluded. There had, however, been cause for worry besides the shock of operation, which evidently brought about the renal insufficiency. He thinks that occlusion of both eyes is secondary, and that this case corroborates Fromaget's theory of uremic origin of delirium.

David<sup>23</sup> published twelve cases of delirium following cataract operation, occurring in 3.32 per cent of the cases operated for cataract, over a period of four years in the ophthalmologic service of Lariboisière, Paris. It is only a variety of postoperative delirium, usually beginning early and accompanied by thermic elevation. The causes are multiple, such as nervous predisposition, senility, apprehension in the patient, darkness, binocular bandaging, isolation, diet, etc. The condition shows great symptomatic polymorphism, ranging from simple mental confusion and dream delirium to violent agitation and terrifying hallucination. He states that the best prophylactic treatment is complete examina-

tion of the patient before and careful surveillance after the operation.

Casey Wood<sup>24</sup> states that the mental balance of old people is especially prone to be disturbed by putting them in a dark room of a strange hospital, to say nothing of the anxiety connected with a serious operation. The majority of insane patients recover under sedatives and judicious suasion. In every case the condition of the bladder, pelvis, urine and blood should receive attention. Care should be exercised to prevent a temporarily insane patient from tearing off the bandages and otherwise injuring his wounded eye.

Hulen<sup>25</sup>, who never had a case of delirium following cataract extraction, thinks that this is due in a great degree to the preliminary preparation of the patient physically and mentally. He uses Ring's mask, thus dispensing with a dark room and thoroly protects the eyes from accident.

Parker<sup>26</sup> succinctly discusses the occurrence of psychoses after operation generally and their cause. Parker's cases are from the Ophthalmic Clinic of the University of Michigan from 1908 to 1912 inclusive. They include cataracts of all kinds in the young and old. There are eleven cases of cataract delirium in 376 cataract extractions (seven in 233 males, four in 143 females). Average age of males 74.28 years; of females 68 years. The psychoses began from twenty-four hours to six days after operation. There were no hereditary mental taints in any case. Four percent solution of cocain was instilled four times in each case. The manifestations were more usual at night. Urinary disturbances were eliminated.

In the discussion of Parker's paper<sup>26</sup> Jackson thinks that the cause of delirium is a mental disturbance due to senility and cites a case. Greenwood of Boston had two severe cases. He thinks it is mental shock in patients treated in a hospital. Wescott had one such fatal case, a man aged seventy-eight, in whom delirium began within twenty-four hours after operation. He quieted down but ten days later again broke out and jumped, injuring himself

fatally. Melville Black thought the essential thing in such cases is to give the patient mental rest, especially by suggestion. Zentmayer cited two cases to show that the condition is not always due to the patient's being operated away from home. Risley saw many cases. He is sure that being left in the dark is not always the cause, but has seen the delirium disappear after removal of the bandage from the unoperated eye. He gives his cataract patients a mixture of *nux vomica*, *cinchona* and *gentian* after operation and if old, gets them out of bed quickly.

Bruns<sup>27</sup> states that the postoperative dementia of cataract occurs only in the aged from confinement in the dark under lonely conditions, is more likely to occur when both eyes are bandaged, and his experience with ambulatory postoperative treatment of cataract confirms his views. Previously he had observed several cases of postoperative dementia in the hospital, and in two cases death resulted. Among 232 cases treated by the ambulatory method not a single instance of dementia occurred. These patients remained at home, visiting the hospital daily (under charge), for dressing, etc.

Golowsky<sup>28</sup> states that delirium was observed nineteen times in 2,430 operations. These were gathered from various reports of different statistical authors, and he rather incriminates the use of atropin.

The 9th Congress of Alienists and Neurologists as quoted by Truelle<sup>29</sup> adopted these opinions which he sustained: "The value of the element obscurity in the genesis of the delirium is superfluous. The only influence it may have is its painful moral impression, the fright it causes the patient. If this is sufficient to provoke a delirium it shows that the patient is singularly subject to emotion and thus predisposed. It would appear thus that delirium only occurs in those who have some hereditary predisposition to it."

Brownell<sup>30</sup> writes regarding the patients observed with delirium in the University of Michigan Clinic, which have already been reported by Parker,



and gives the following further particulars:

1. Delirium occurred in 3.1 per cent of the 962 cases operated upon.

2. The average age was 72 1/3 years, while the average age of those having senile cataract was between sixty and seventy years.

3. 33.6 per cent occurred in alcoholics.

4. In no case in the series did the urine indicate nephritis.

5. Hypnotics are the most effective drugs for controlling these patients.

6. The prognosis as regards the health or vision of the patient is usually not affected by the occurrence of delirium.

Despite the fact that kidney disturbance is said to be necessary in the development of postoperative delirium, there was no case in this series in which the records show albumin, casts, or sugar in the urine. In the discussion Brownell said that at least half of the patients when they came in were suspected of being potential cataract deliriums and showed a predisposition to it.

**ETIOLOGY:** The causes given in the literature for delirium following senile cataract operations are: bandage, loneliness, stomach trouble, run down condition and nervousness, circulation disturbances involving brains atrophied by senility, preoccupation before operation, regime to which the patient is submitted, fear of losing sight, alcohol and being deprived of it, atropin, senility, psychic, autointoxication, homesickness, mental shock, fright.

**TREATMENT:** Arlt<sup>6</sup> recommends removal of bandage from the unoperated eye. Posey<sup>10</sup>, chloral and bromides. Frankl-Hochwart<sup>14</sup> gives alcohol to alcoholics. Wood<sup>24</sup>, bladder, pelvis, urine and blood should receive attention. Risley removes bandage from unoperated eye and gives a mixture of nux vomica, cinchona and gentian after operation and gets them out of bed quickly if old. Bruns<sup>27</sup> believes the ambulatory treatment prevents delirium.

**AUTHOR'S RECENT CASES:** The author has observed four cases of delirium fol-

lowing operations for senile cataract in 200 consecutive operations, and they were all grave. In two of them the vision was entirely lost, one retained 20/100 and the other 20/30. The one with 20/100 was operated upon for cataract in the fellow eye two years previous, with complete loss of sight; and the one retaining 20/30 was operated upon in the fellow eye ten years previous, with complete loss of sight. The history of this case is interesting and instructive:

E. E., age 64 years. General health good. Right eye operated June 1908 by a very competent operator. Sight lost. June 18th, 1918, left eye operated without complications. He was a model patient, did not make any complaint and the first inspection of the eyeball was made June 27th, or nine days after the operation. The corneal wound was closed, anterior chamber full, iris not prolapsed, the eye was quite free from postoperative inflammation and he could count fingers at five feet. Smoked glasses were prescribed for the day and a light bandage at night.

The next morning the bandage was removed, smoked glasses ordered during the day, and a light bandage applied at night. About 10:30 P. M., June 29th, or eleven days after the operation, he began talking loudly, attracting the attention of other patients in the ward as well as of the night nurse and house physician. He wanted to get up and while the nurse and house physician were trying to quiet him, he tore the frail cords from his wrists, which were put on and tied under the leg to keep him from interfering with the bandage while sleeping. As soon as his hands were free, he tore the bandage from his eye and was restrained with difficulty from getting up. He finally quieted down and the bandage was again applied, but in a short time he began to rave and was again restrained with difficulty.

Finally he seemed to wake up and when he recognized those around him and knew he was in the ward, he told the nurse he had been dreaming and was glad he woke up. He then went

to sleep and did not wake up until morning, when he related the dream and stated that he must have been insane. He said he thought he was at a spiritualistic meeting where he was blindfolded and bound in such a manner that he could not move and feared being killed. He said that with one heroic effort he broke the ropes that he was tied with and then tore the bandage from the eyes, and was going to jump out of the window when he woke up.

**CONCLUSIONS:** The reader is referred to Etiology in this paper and also to Kipp's report of twelve cases in 1903, where both eyes were bandaged in only one of the cases when the delirium began. Alcohol or the want of it can be eliminated in all four of the cases reported by the essayist; and atropin can also be eliminated because it was not indicated or instilled in any of them. The lenses were all removed in capsule, the eye lids were not opened for nine days, and they were all treated by the methods usually employed.

The author desires to emphasize the fact that great care should be exercised in getting the history of old people be-

fore operating for cataract. In all cases when possible, we should have one of their friends remain with them during their entire stay in the hospital, and to especially emphasize dreams to the attendant; and upon the slightest tendency to delirium, have their friends (who are their attendants) attempt to wake them up, and persist in it. The voice of a friend would naturally have more tendency to wake a patient who was dreaming than that of a stranger. The more the house physician and nurse talked to the author's reported case, and the more they tried to restrain him, the more delirious he became until he woke up.

If it appears necessary to have the operated eye bandaged, there is no reason why the bandage should not be re-applied after the patient wakes up, providing it was necessary to remove it to wake him up. Emphasizing dreams is not advocated to displace other methods of treatment, but there is a possibility that removal of the bandage, which is so generally recommended may be the chief factor in waking the patient from his dream

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## POSTDIPHTHERITIC OCULAR PARALYSES WITH REPORT OF THREE CASES.

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This is an analytical review of the literature relating to the subject which brings together the reported cases of each form of single or group paralysis. It is supplemented by three case reports and includes the bibliography of the subject.

Cases of postdiphtheritic paralyses of the eye muscles are reported now, as well as before the introduction of the diphtheria antitoxin into the therapy.

While the antitoxin has enormously reduced the death rate for diphtheria, it has not caused the paralyses to be diminished in proportion. Then while it attacks, under favorable conditions, the Klebs-Loeffler bacillus destroying its toxin, apparently it has no action and cannot prevent, in all cases, this late manifestation of the infection. The cause of this fact is not very clear. Osler<sup>1</sup> quotes Rollaston's study, which indicates that the early use of antitoxin diminishes the liability to paralyses. Forchheimer<sup>2</sup>, in a discussion on this subject, states that, since the changes, which the diphtheria toxin produces in the peripheral nervous system, have been conclusively demonstrated by Roux and Yersin, either the theory of antitoxin is at fault or the antitoxin is not adequately used.

It is a fact that the serum is still empirically used against diphtheria. The exact amount of the toxin circulating in the blood of the patient is not known, and then it is not known how

many antitoxin units are to be injected in order to neutralize all the circulating toxin; and while the antitoxin, that is used for treating a case of diphtheria, may be sufficient to neutralize a great amount of the toxin, and to arrest the growth or attenuate the virulence of the bacilli, and to get the disappearance of the general and local symptoms, other toxin may remain in the blood, which is the cause of the paralysis.

It is known that, following an attack of diphtheria, the bacilli may persist in the throat or in the nose after all the membrane has disappeared. Moreover, still virulent bacilli were found by Spolverini<sup>3</sup> in the smear taken from the region primarily affected in all his patients affected by postdiphtheritic paralyses. As the disease manifests itself, in the majority of cases, as a flaccid condition of the muscles, he also queries whether this sequel of diphtheria should be more properly called *myasthenia* instead of *paralysis*.

Statistics upon the appearance of paralysis in ocular muscles vary widely, going as high as to be present in 197 cases of the total of 494 cases of diph-

theria, Woodhead<sup>4</sup>, it occurs in 25 per cent of all cases of diphtheria according to some authors<sup>5</sup>, and in 7-8 per cent according to others<sup>6</sup>.

Ocular muscles can be affected separately or, more often, in association with paralyses of the muscles of the palate, or of the pharynx, arms, legs, and others. These paralyses, which are proportionately less frequent in children than in adults, can be a result of a severe attack of diphtheria as well as a mild one; the local lesion in fact, may be so trifling that the onset of the paralysis alone calls attention to the true nature of the trouble. It is stated that the paralysis of accommodation may occur in connection with these very light forms of the infection, while paralyses of the exterior muscles are apt to follow severe cases.

The time that paralyses of ocular muscles make their appearance is not constant; usually they manifest themselves during the convalescence of diphtheria, coming during the second, third, or fourth week of this period. In rare instances they occur in the height of the disease, or as late as eight weeks after the beginning of the infection.

From a review of the literature, it appears that the first to mention the organ of sight in connection with diphtheria is Faure<sup>7</sup>. In a description of a case observed by him coupled with a report of six others, Faure, in 1857, speaks of general paralytic symptoms, and among them, mentions "weakness of sight," and once "strabismus." Cases also are reported a year later by Richard and Meyer<sup>8</sup> in which mention is made of "disturbance of vision." Donders<sup>9</sup> then reports many cases that were "presented to him after diphtheria began to manifest, in the beginning of 1860, in several places of Netherland." He gives a right appreciation of the "weakness of sight" and "disturbance of vision," demonstrating that these ocular symptoms are not a result of a "disturbance of retina" as it was previously believed, but a result of paresis or paralysis of accommodation.

The literature then grows richer with the reports of other cases, which show that not only the accommodation and then the ciliary muscle, but also the sphincter of the pupil and all the exterior muscles can be affected, giving rise to the different varieties of ophthalmoplegias. This is true not only for the cases reported before but also for the cases that have appeared since the antitoxin has been widely employed.

**CYCLOPLEGIA.** The ciliary muscle, however, is of all the muscles the most frequently affected. Cycloplegia can be isolated, or associated with complete or incomplete paralysis of the sphincter of the pupil, or with paralysis or paresis of one or more of the exterior muscles supplied by the same third nerve, or by the fourth and the sixth. In the isolated or associated forms it can be monolateral or, more frequently bilateral, partial or complete, rarely persistent or permanent. T. Laennec<sup>10</sup> in 1868 and after him Badal<sup>11</sup>, Carreras Arrago<sup>12</sup>, Tweedy<sup>13</sup>, Jessop<sup>14</sup>, Ottava<sup>15</sup>, Ruhemann<sup>16</sup>, Hutchinson<sup>17</sup>, Sym<sup>18</sup>, Schirmer<sup>19</sup>, Hochhaus<sup>20</sup>, report cases of *complete unilateral or bilateral cycloplegia*. Mention is made of a similar case by Henderson<sup>21</sup> in 1909, and by Espiño<sup>22</sup> as recently as 1918. Of partial cycloplegia, cases are mentioned by Landmann<sup>23</sup>, Castle<sup>24</sup>, Bylsma<sup>25</sup>, and recently by Pape<sup>26</sup>. Park Lewis<sup>27</sup> reports a case of cycloplegia, which was cured by a second attack of diphtheria. A case of *persistent isolated paralysis* of accommodation is reported by Oloff<sup>28</sup>, and a case of *permanent paresis* of accommodation by Mushman<sup>29</sup>.

**IRIDOPLEGIA.** Benson<sup>30</sup> cites Abercrombie, who, in a paper on the subject, states that all the 18 cases of postdiphtheritic paralyses, reported by him in the International Congress of 1881, had "mydriasis." Weber<sup>31</sup> in a report of a series of cases of similar paralyses, mentions also "mydriasis," and Paul Meyer<sup>32</sup> states that his patient had pupils "uniformly dilated." In other cases, rare however, the paralysis of the sphincter is associated with paralysis of the ciliary muscle, or of the exterior muscles.



**TOTAL INTERIOR OPHTHALMOPLEGIA.** Donders<sup>33</sup> mentions a case of a girl 26 years old, who, five weeks after a severe inflammation of the throat, "applied to him, complaining of a disturbance of vision." On examination he found that the disturbance depended on a "diminution of the power of accommodation." The girl also had "pupils wider than usual, particularly the right one, reflex movement to light, tolerably good, and the accommodative movement, particularly in the right eye, very limited." He reports also a case of a boy aged 15, who had "paralysis of accommodation, large pupils, slight motion reflex, and scarcely perceptible accommodative movements."

Callan<sup>34</sup> mentions two cases of post-diphtheritic paralysis, one of which, a girl 11 years old, after an attack of diphtheria, showed "pupils slightly dilated and paralysis of accommodation." Risley<sup>35</sup> reports a case of "paralysis of iris and accommodation"; and Farnarier<sup>36</sup> a case of a woman 25 years old, who, "with paresis of accommodation also had paresis of the sphincter."

E. Wiegemann<sup>37</sup> mentions a case of monolateral and persistent paralysis of accommodation and permanent dilatation of the pupil. A boy had diphtheria three years before and, since that time, he had not been able to read. He had dilatation of the pupil of the right eye with preservation of the reaction to light and paralysis of accommodation of the same eye; a year later "the paralysis of accommodation disappeared but the right pupil remained more dilated than the left one." J. J. Pattee<sup>38</sup> reports a case of a woman 36 years old, who, among other general paralyses, had "paralysis of the intrinsic muscles of the eyes," altho antitoxin had been used.

Stephenson<sup>39</sup> speaks of an unusual pupillary symptom associated with postdiphtheritic paresis of accommodation. He noted the symptom in a boy nine years old who, five weeks before, had been affected by "ulcerated throat." The boy had, beside other general paralyses, paresis of accommodation and normal reaction of the pupils to

light but "no near-vision pupillary reflex." He also mentions two of similar cases observed by Tooth and Lohmann. Tooth, who was the first to note the symptom, called it "accommodative iridoplegia." He found the symptom in an adult male patient who, a month before, had had an attack of faucial diphtheria, which had been treated with antitoxin. The patient, together with other general paralyses, showed "weakness of left orbicularis palpebrarum, paresis of the ciliary muscles, and normal response of the pupils to light but not to accommodation." Dr. Lohmann's case, a girl eight years old, about three weeks after an attack of diphtheria, showed "paresis of accommodation with the entire loss of near-vision pupillary reflex, together with retention of light reflex and the power of convergence."

Exterior muscles are also affected singly, or in association with paralyses of interior or other exterior muscles, forming different combinations, which can be classified as follows:

**OCULOMOTOR PARALYSIS.** (a) *Total oculomotor paralysis.* Donders also mentions a boy who, after an attack of angina, diphtheria, beside other general paralyses, showed "paralysis of the muscles of accommodation together with incomplete ptosis and divergent strabismus, all indicating a total paralysis of the oculomotor." Gowers<sup>40</sup> cites a case in which all the muscles supplied by one third nerve were paralyzed. Parkinson and Stephenson<sup>41</sup> mention a case of a girl nine years old, who, beside general paralyses, showed partial bilateral ptosis; pupils large and equal, which reacted sluggishly to light and not at all to accommodation; and "paralysis of all exterior muscles except the external recti, and (possibly) the superior oblique." Teillias<sup>42</sup> mentions two cases. A boy nine years old was affected by right hemiplegia and complete paralysis of the right third nerve. The left eye showed a paresis of the superior rectus. The other case, a boy seven years old, had bilateral incomplete ptosis, and complete paralysis of the same third nerve. The

left eye showed a paralysis of the superior and inferior recti.

(b) *Partial oculomotor paralysis.* Callan<sup>43</sup> also mentions a case of a boy 4½ years old, who, beside left hemiplegia, had incomplete bilateral ptosis with bilateral cycloplegia, and Rumpf<sup>44</sup> a case of paresis of accommodation and insufficiency of both internal recti. Scheby-Buch,<sup>45</sup> among 38 cases of paralysis of accommodation found two cases of insufficiency of internal recti, one of which also had paresis of the pupils. Farnarier<sup>46</sup> mentions another case of postdiphtheritic paralysis of accommodation in which there was a persistent paralysis of convergence.

**PARALYSIS OF SUPERIOR OBLIQUE.** The superior oblique is rarely affected. Isolated paralysis is reported by Graefe<sup>47</sup> and Kraus.<sup>48</sup>

**PARALYSIS OF THE EXTERNAL RECTUS.** The external rectus is, among the exterior muscles, the most frequently affected. (a) *Isolated paralysis*, either monolateral or, more often, bilateral, partial or complete, is mentioned by A. Graefe,<sup>49</sup> Henoch,<sup>50</sup> Denig,<sup>51</sup> Rother,<sup>52</sup> Hochhaus,<sup>53</sup> Heintz,<sup>54</sup> Friedenwald,<sup>55</sup> Adams,<sup>56</sup> Begue,<sup>57</sup> Parkinson and Stephenson.<sup>58</sup> Terrien<sup>59</sup> reports a case of a boy five years old, who, six weeks after a diphtheritic angina, showed a paralysis of soft palate and paralysis of both external recti. Paralysis disappeared rapidly after an injection of 40 cc. of antidiphtheritic serum.

More frequently the paralysis of the external rectus is associated with paralysis or paresis of the interior, or also with paralysis or paresis of other exterior muscles.

(b) *Combined paralysis of the external rectus:* Marina<sup>60</sup> reports a case of paralysis of accommodation and of the right abducens; Dubois<sup>61</sup> speaks of a case of bilateral paralysis of accommodation with monolateral paralysis of the abducens. Ziemssen<sup>62</sup> makes mention of paresis of accommodation with bilateral abducens paralysis. Rosenmeyer<sup>63</sup> among ten cases of cycloplegia found two cases of paresis of both external recti; and Remack<sup>64</sup> among 100 cases of paralysis of accommodation found ten cases in which one or both

external recti were affected. Benson<sup>65</sup> records a case of a girl 11 years old, who, six weeks after a diphtheritic inflammation of the tonsils and pharynx, had paresis of accommodation which lasted seven weeks, double ptosis which lasted a week, and paresis of both external recti, which lasted about three weeks. Morton<sup>66</sup> reports three cases of cycloplegia with more or less complete paralysis of the external recti muscles, and in one case the superior and inferior recti were also paralyzed. De Schweinitz<sup>67</sup> found, on examination of a boy 4½ years old, three weeks after an attack of diphtheria, ptosis and weakness of the right and left external recti muscles, irregularity of pupils (right larger than the left), and paralysis of the ciliary muscles. Février<sup>68</sup> reports a case of incomplete paralysis of accommodation and of the two external recti muscles together with paralysis of the orbicularis of the right eyelids. Moll,<sup>69</sup> in 150 cases of postdiphtheritic paralysis of accommodation, found four cases of iridoplegia, one case of ptosis, sixteen cases of bilateral paresis of the external recti muscles.

**TOTAL EXTERIOR OPHTHALMOPLEGIA and TOTAL OPHTHALMOPLEGIA.** Cases in which almost all of the exterior muscles and almost all (interior and exterior) muscles of both eyes were affected are reported by Mendel,<sup>70</sup> who, in a boy, five weeks after a mild attack of diphtheria, found double ptosis, multiple paresis of the muscles of the right eye and paresis of all the recti muscles of the left eye. Ewetzky<sup>71</sup> mentions a case of a girl, who, two weeks after a sore throat, showed dilated pupils, bilateral ptosis, abolition of upward and downward movements of both eyes, and limited lateral movements. Uhthoff<sup>72</sup> mentions two cases in which almost all the muscles of both eyes became paralyzed. In one case there was double ptosis and double cycloplegia. The right eye was motionless, and in the left eye the only action was in the external rectus. Marina<sup>73</sup> mentions a case of paresis of both internal recti, of both external recti, and of the right superior rectus

and superior oblique. Goodall<sup>74</sup> among 1071 cases of postdiphtheritic paralysis, reports, beside 56 cases of paralysis of accommodation, 7 cases of monolateral and 3 cases of bilateral paralysis of external recti, also two cases in which the most part of the ocular muscles were affected. Remack<sup>75</sup> also mentions a case of bilateral paralysis of the oculomotor and abducens.

Cases of *permanent* paralysis of exterior muscles are reported by Duane and Morvat. Duane,<sup>76</sup> in a girl of six years old, found, four years after an attack of diphtheria, "paresis of both externi with secondary deviation of the interni"; and Morvat,<sup>77</sup> in a patient, two years after an attack of diphtheria, found a paralysis of left internal and left inferior recti, and paresis of left superior rectus and paralysis of right inferior rectus. Four years later he still showed paralysis of both inferior recti.

In some epidemics, it has been noted, paralyzes appear and disappear suddenly, one muscle being attacked after another (Pagenstecher,<sup>78</sup> Gowers,<sup>79</sup>).

Postdiphtheritic paralysis has been considered as a toxic neuritis due to toxin circulating in the blood. Landammann, who is mentioned above, thinks that, in the majority of cases of cycloplegia, the paralysis is due to a perverted state of the blood influencing the nutrition of muscles and not the nerve or the nerve ending. Sym thinks that it is due to poisoning of the nerve just as in paralysis caused by sausage or fish poisoning. The pathology of diphtheritic paralysis, however, is very much in doubt. It has been ascribed either to capillary hemorrhage in the nerve nuclei, or disease of blood vessels supplying the nuclei or the nerves, basal or orbital neuritis and inflammatory changes in the muscles themselves.

Weisenburg, on discussing the different findings reached by the anatomic pathologic research of Mendel and P. Meyer, who found changes in the bulbar nuclei with a degenerative neuritis of the cranial nerves; of Hochhaus, who, in an instance, noted that the alterations were limited to the

muscles; of other authors, who found that the changes are confined, in the majority of cases, to a degeneration of peripheral nerves, states that, from pathology, we can not come to a definite conclusion whether the cause of this palsy is central, peripheral or both.

#### REPORTS OF CASES.

To the above reported cases I would like to add the following, which came under my examination in the clinic of Dr. Bailey, by whose kind permission I publish them. The first one is a case of bilateral isolated paresis of accommodation, the second and the third are cases of isolated paresis of the right external rectus. In these cases the paresis manifested itself from four to seven weeks after the appearance of the primary disease. With the view of determining whether the usual treatment is of any avail either to shorten the duration or in regard to the final result of the paralysis, no treatment was advised. The paralysis lasted from four to six weeks, it passed away entirely and at present time the condition of the eye muscles is entirely normal.

CASE 1. Mrs. A. J., a married housewife, 36 years old, came to the clinic on May 14th, stating that for two days she had not been able to see well while doing any near work. Nothing special in her previous history, no chronic disease or miscarriage.

On April 2nd she had contracted diphtheria of the tonsils; had had an injection of 5000 a. u. the day after; recovered five days later. Culture had been taken from the throat by the attending physician and found positive for diphtheria.

Both eyes were externally normal, pupils 3 mm. in diameter, reacted promptly to light and consensually, sluggishly to accommodation and convergence.

Vision R. 20/20. L. 20/20. Fields of vision normal for form and color; media clear, fundus negative.

On testing the near point I found that she could read, holding the test type at a distance of 18-20 cm., the type 0,50

only with the help of a lens +3.50 in front of each eye.

Paresis was stationary for two weeks. Subsequent examination showed that it gradually improved and on June 11th, she could read type 0.50 at 18 cm. without the help of any lens.

The paresis started about six weeks after the beginning of the primary disease and lasted about four weeks.

CASE 2. A. J., a daughter of Mrs. A. J., 4 years old, was brought to the clinic on May 26th by her mother, who stated that for three days the girl's right eye was turned in. On talking her voice has a distinct nasal phonation. No past disease. The girl had contracted diphtheria on March 30th. Culture had been taken from the throat and found positive for diphtheria. One injection of 5000 a. u. had been made, and the girl had recovered from infection in six days.

R. E. was turned in; and, on lateral movements to the right, it could not go beyond the median line. Movements in any other direction were normal. Excursion of L. E. normal. Secondary deviation greater than primary. Pupils reacted to all tests. No general paralyses were present.

July 2nd. Primary position of both eyes normal; excursion of right eye normal in all directions.

Paresis started about seven weeks from the beginning of infection and lasted about five weeks.

CASE 3. M. W., 8 years old, came in on February 26, 1919. The mother states that for about three weeks the girl had been complaining of diplopia, and her right eye had been crossed. The girl had been affected with diphtheria of the tonsils on January 1, 1919.

Culture had been taken and found positive for diphtheria, and antitoxin had been administered.

Eyes examination showed that R. E. was turned in, and on lateral movements to right it could not pass the median line. Movements in every other direction were normal. Movements of left eye normal. Secondary deviation greater than primary. Pupils reacted to all tests. Vision and fields of vision normal; accommodation normal. No general paralytic symptoms were present.

March 17th. Primary position normal, and all movements of right eye were normal.

Paresis began about five weeks after the beginning of diphtheria and lasted about six weeks.

As in previous cases no treatment was advised.

REMARKS. These three cases and many others reported in the literature show that the paralysis of the eye muscles can be a sequel of diphtheria irrespective of the use of antitoxin and the age of the patient.

Diphtheria can paralyze the eye muscles without producing paralyses of muscles of other organs.

Postdiphtheritic paralyses of eye muscles pass away spontaneously.

Treatment has no influence on the course of these paralyses. In my cases paralysis lasted from four to six weeks. This is the usual duration of postdiphtheritic paralysis, as far as we know from the cases reported in the literature.

The eye muscles, in postdiphtheritic paralysis, usually regain their function entirely.

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# NOTES, CASES AND INSTRUMENTS

## A PRISM METER-MEASURE, FOR USE IN RETINOSCOPY.

JOHN N. EVANS, M.D.,

BROOKLYN, N. Y.

In order to provide an accurate and practical means for measuring the distance between subject and examiner a simple device is herewith presented.

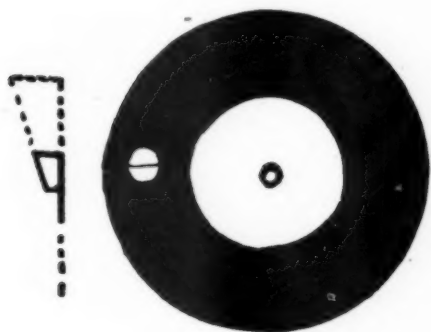


Fig. 1—Prism mounted in rim of retinoscope with edge at middle of aperture. Front view and enlarged section.

A prism of one prism diopter strength is mounted behind a 5 mm. aperture so that its edge bisects the opening. If this is held before the eye a prismometric scale will show a deviation. When the scale is exactly one meter distant, the displacement will be one centimeter. At a greater or less distance the displacement will be greater or less respectively, and in proportion. A simplified scale is suggested—a horizontal line upon which are erected two perpendiculars two centimeters apart, another line is dropped from the horizontal at a point midway between the two uprights. This scale may be placed on the trial-frame, on a blinder, on the retinoscopic rods, the subject's head, etc.

When the prism is held with its edge in the perpendicular meridian of the pupillary area (and in the position of minimum deviation) all the lines are of equal intensity and the long horizontal

line is single. A cross will be formed as soon as the desired distance is found. With a carefully selected prism the device is surprisingly accurate—a desirable point, particularly when working at distances of less than a meter. With the prism mounted in the rim of the retinoscope the range may be instantly found without removing

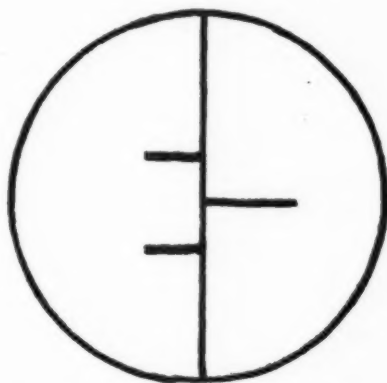


Fig 2—Scale to be placed on trial frame or patient's head. When doubled by prism the single cross marks exactly corresponding to one of the two cross marks on the other side gives the distance at one meter.

the instrument from the eye, and the scale—best, white, on a black ground,—is illuminated by the mirror.

## ADVANCEMENT BY MEANS OF A SILVER SCREW CLAMP.

ROBERT VON DER HEYDT, M.D.,

CHICAGO, ILL.

During the past three years I have done over twenty-five advancements by using a screw-clamp for the purpose of tucking the muscle in cases of strabismus, with perfect results.

This clamp is made of silver and is closed by two screws such as are used in holding the lenses of rimless eyeglasses, placed 7 mm. apart. The clamp remains fixed in situ until it is freed and expelled from the conjunctival sac.

Method of application:

A partial or complete tenotomy of the opposing muscle is first done. The

conjunctiva over this is then sutured.

After the muscle to be advanced is located under a free conjunctival opening, it is exposed and freed for a length of about half an inch, by means of two tenotomy hooks, one held in each hand.

The scleral area just back of the muscle attachment is next curetted with a sharp chalazion spoon. This no doubt aids in obtaining an early and firm reattachment of the muscle.

A heavy black thread is carried under the muscle by means of a blunt curved needle.

Both ends of this thread are now passed thru the clamp and the latter is allowed to drop over the muscle.

The assistant draws the muscle thru the clamp by means of this thread, one end being held in each hand, while the operator presses the clamp over the muscle, pushes it down, closes it and holds the clamp firmly with an ordinary broad tipped tissue forceps. The latter is modified in so far that it has a shoulder on the inside of each lip. While the clamp is held with the left hand the two screws are firmly set with a small screw driver.

It is very important that both screws enter easily. Conjunctival or other tissue should not be allowed to become entangled and carried with the threads of the screws. This would cause the latter to bind before the muscle is well clamped. If this should occur the clamp must be taken off and the screws thoroly cleansed of all tissue before its reapplication. The amount of muscle advancement may be instantly increased by loosening the screws somewhat, the assistant then draws the muscle further thru the clamp, while the operator presses it down with the forceps and again sets the screws.

The black "lifting" thread is cut off, leaving a short piece under the projecting muscle.

If thought advisable the conjunctiva may now be sutured just in front of the clamp, the threads reversed and their ends carried around the back of the clamp and there tied.

The reaction is less than in suture operations.

Both eyes are bandaged for four days.

The eye is dressed after two and four days, then daily and kept bandaged for a few days after the clamp has come off.

The latter is expelled from the conjunctival sac in from seven to fourteen days.

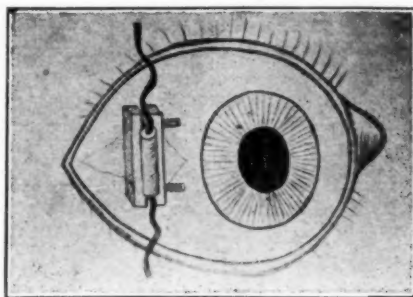


Fig. 1.—Silver clamp for advancement of recti muscles showing clamp applied to fold of tendon. Thread by which tendon is drawn into clamp remaining in fold.

Fresh argyrol, silvol, or a similar solution is instilled at each dressing.

The clamp causes no inconvenience or pain.

The method of application is extremely simple.

The same clamp may be used repeatedly.

### HERPES ZOSTER OPHTHALMICUS.

HARRY VANDERBILT WÜRDEMANN, M.D.  
SEATTLE, WASHINGTON.

The arrangement and appearance of the scars left by ophthalmic herpes is so characteristic that the diagnosis is often made from them years after the occurrence of the attack. But we find very few good illustrations of the lesions in the literature related to it. The following cases seen at the height of the attack presented such typical appearances that the photographic record of them then obtained seems worthy of publication.

CASE 1. O'N., J. J., Pvt., aged 30, Jan. 8, 1919. Three days ago he had slight facial neuralgia, and then herpetic vesicles over the superior branch of the left fifth nerve. Many abscessed





Fig. 1.



Fig. 2.

teeth with pyorrhea and follicular depressed tonsils. His teeth were treated and some removed. Tonsils were treated. In two weeks he was practically well, with little scar formation. Regarded as a self limited disease of six weeks to three months' duration, from focal infection causing a neuritis of the sphenopalatine ganglion.

CASE 2. L., D. D., 2nd Lt., aged 29, Dec. 25, 1918. Six days ago he had neuralgia of the fifth nerve, then erup-

tion over the superior and middle branches. Two weeks later affecting the conjunctiva with a vesicle thereon. There was secondary iritis not yielding to atropin. Regarded as a self limited disease of six weeks to three months, from focal infection causing a neuritis of the sphenopalatine ganglion. In this case cause seemed to be of intestinal origin. The case went six weeks with a resultant scarring of the face and posterior synechia of the left iris.

## SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

### SECTION ON OPHTHALMOLOGY, COLLEGE OF PHYSICIANS OF PHILADELPHIA.

MARCH 18, 1920

DR. G. ORAM RING, Chairman

#### Treatment of Congenital Cataract.

DR. P. N. K. SCHWENK applied his remarks to lamellar cataract, it being the most common form in children. In all cases where the pupillary area is covered, he favors early operative interference in order to maintain the retinal function, and cited cases where delayed operations caused amblyopia due to failure of early retinal stimulation. The operation is that of curettement of the lens, removing as much of cortical as possible thru a small opening into the upper part of the cornea by means of a broad needle. Under general anesthesia and a widely dilated pupil he enters his broad needle in the upper part of the cornea just in front of the iris so as not to have the iris engage in the opening, passing needle deep into the lens, making two lateral movements with needle, so as to make a large opening into the lens, withdrawing needle with gentle backward pressure to invite cortical to engage into the wound over needle, then with iris forceps grasp the anterior lip or flap of capsule and withdraw it. If the capsule is shriveled, or too tough to

rupture with the needle, grasp the capsule with iris forceps and by gentle traction remove capsule with lens contents, dress the eye, apply bandage, which is retained for three days when the eye can be left unbandaged.

Dr. Schwenk stated that discission was nothing more than an intended traumatic cataract and the treatment of traumatic cataract is curettement of lens and therefore it is logically the safest treatment for congenital cataracts. The radical operation is not attended by any greater risk—not as much—than that of discission. Later on repeated operations are rendered unnecessary and add much to the pleasure and physical development of the patient. Dr. Schwenk cited that he operated on his first case at eleven months, removing a shriveled lens capsule in its entirety, and three months later repeated the operation on the other eye.

DISCUSSION.—Burton Chance stated it had been his privilege to assist Dr. Schwenk in a number of his early cases, and besides witnessing the operations in others, he has examined several of the earlier cases in recent months. Except in the instances cited by Dr. Schwenk, there had been uniform freedom from entanglements of iris and capsule in the cicatrices. In spite of the points so pertinently brought out in the discussion, he believes that from the results obtained

Dr. Schwenk has been justified in his procedure.

In Dr. Chance's opinion, in considering cataract in the young, when so dense as to render the child blind, the surgeon should operate early before the child's mental and physical natures are set, for, even tho light perception only is gained the child's development will be benefited by the removal of the opaque lens.

Dr. Posey said that he could not agree as to the desirability of operating as early as possible in congenital cataract, for in his judgment the age at which the operation should be undertaken depends largely upon the extent of the opacification of the lens and the degree of vision, for while he considers it desirable to remove the opacity as early as possible in eyes that are blind or in which the vision is very much reduced, on account of the danger of the mental development of the child being retarded from lack of sight, he makes it an invariable rule not to operate until the child is ten months old, for at an earlier age the structures comprising the anterior segment of the eye are so small and so little developed, that it is scarcely practicable to perform the necessary instrumentation. Moreover, it has been asserted that the amount of aqueous humor in a younger child is insufficient to procure the solution of the liberated lens substance. Dr. Posey, however, insists that operation should not be deferred later than ten months in such cases, for, while it is true that the mentality of many infants with congenital cataracts is permanently deficient and the lenticular opacities coexist with other stigmata of degeneration, he has seen improvement of vision stimulate the mentality in too many cases not to consider its betterment in all instances at as early an age as possible.

In all cases, however, in which the opacification is not complete and vision is fairly good, it is well to postpone operating until even three or four years have been attained, for the longer the surgeon waits the more the eye develops and the more apparent does the exact nature of the lenticular opacity become, and the dressing and bandaging of the eye

is easier and there is less danger of infection.

He does not believe the functions of the retina are at all interfered with by delaying the operation. He thought Dr. Schwenk's procedure more dangerous than simple discission, on account of the liability of entanglement of the iris.

Dr. Zentmayer said, while he believed in early operating in congenital cataract he did not think we need be deterred from waiting until the child has grown for fear of loss of function of the retina, as there is no analogy here to amblyopia ex anopsia. Cases are on record where excellent vision was secured after the absorption of congenital cataracts as late in life as the twenty-fifth year. He believed the needling operation for congenital cataract, where there is no evidence of undue thickening of the capsule, by far the safest operation. A single needling is often sufficient if the surgeon and patient are willing to wait and let Nature act. Usually, however, more than one operation is required. When the needle is entered thru the sclera the danger of infection is negligible. It is difficult to avoid an anterior synechia in the linear method. Recently there was exhibited before a local society three children who had been operated upon by a modified linear extraction and in two there was anterior synechia. In a case recently operated upon the diagnosis of thickened capsule was confirmed at the operation for on attempting to withdraw the knife-needle the lens was brought into the anterior chamber where it was successfully removed by the Ewing method. This consists in passing a broad keratome behind the lens so that the pupillary area is shut off and in delivering the lens along the blade of the keratome.

In discussing Dr. Schwenk's paper, Dr. Risley said that he knew of no other group of cases requiring surgical interference in ophthalmology that required more individual judgment and ingenuity in their management than congenital cataract. In the first place they occurred quite habitually in children who are otherwise abnormal; the lens disease being only one manifestation of the disorders of the tissues developed from the

ectoderm and mesoderm thruout the body. There were usually intestinal disorders leading to a general toxemia, glandular enlargements, and choroidal disease which was the immediate cause of the lens opacity.

He thought it was better to treat these general disorders, and to avoid all operative interference upon the eyes until the child was five to ten years of age. He had often found a preliminary iridectomy a wise procedure, after which the general health of the eye seemed to improve. He was often controlled by the peculiarities of the individual case as to what subsequent operative procedure should be undertaken. He thought in the majority of cases that discission operations were desirable, and where the capsule appeared tough, and proved to be resisting to a single knife needle, he had a second one at hand and inserted it from the opposite side of the cornea to that first pierced and made the one knife a point of resistance for the other, their points being separated in the lens, the two moving in opposite directions. By this method he had often succeeded in tearing or cutting the capsule and incising the opaque portions of the lens and in securing an open pupil, where he had failed with but one Hay's knife.

Dr. G. Oram Ring referred to a method he had learned from Dr. Risley and had used with great satisfaction, namely, with pupil dilated *ad maximum*, the Hays-Ziegler knife was used to incise capsule and lens, in a vertical direction, the incision beginning just below the upper dilated pupillary border and extending downward to a position just above the lower border.

While the incision was carried deeply into the lens, it did not penetrate the posterior capsule, as did Dr. Ziegler in his V-shaped method.

Dr. S. Lewis Ziegler thought personal opinions could reasonably differ according to each one's experience. He would operate on congenital cataract at any age, early or late, depending on the indications. He did not think that delay would destroy visual function, but it might cause mental hebetude or loss of muscular coordination. He had seen congenital cases operated on at thirty, forty

and sixty years of age retain full visual acuity. There might be loss of proportion or the sense of distance, but this could occur at any age and was soon overcome by training.

Curettement of the lens, paracentesis and linear extraction were practically identical procedures. The possible complications of this procedure are iris prolapse, entangled capsule, rapid swelling of cortex, wound infection, corneal astigmatism and anterior synechiæ.

For some years he had been practising thru-and-thru division of the lens by his V-shaped incision. The pressure of swollen cortical was fore and aft and the ciliary body did not become inflamed by swelling in the angle. The cortex dissolved rapidly and only a single operation was required. He had recently operated on a child, aged three years, and another of eight, both of whom he would try to show at the next meeting.

The late Dr. Strawbridge often resorted to paracentesis. He did this operation on the father of the three-year-old child previously referred to, but a prolapse of the iris necessitated iridectomy, and posterior synechiæ followed. By the older methods of discission it is often necessary to resort to paracentesis because of rapid swelling of the cortex. We should therefore welcome any new technic that will help us to escape this complication.

Dr. Holloway stated that he thought the treatment of these cases depended upon the type and character of the cataract encountered. While it may be advisable to defer very early operation in the zonular cases, he believed that total congenital cataract should be subjected to earlier operative procedures. He has just dismissed from the hospital a case of this character in a twenty-two-months-old infant. Each cataract in this case was hypermature. A successful result was obtained. Another infant fourteen months of age was now in the hospital and one eye had been successfully operated on. In regard to Dr. Risley's statement concerning iridectomy, he stated that in certain cases with small zonular opac-



ities Critchett did an optical iridectomy as had been practised by his father. He believed that in certain of these zonular cases, especially with moderate degrees of vision, the lens should not be touched.

#### **Facial Palsy, with Ectropion of Lower Lid.**

DR. WM. C. POSEY exhibited a young man who had developed the above condition as a result of disease of the superior maxillary bone in early childhood. The cosmetic deformity was considerable, but the chief cause of complaint was excessive laceration from the malposition of the lower lid. To correct this a thoro division of a series of cicatricial bands, which bound down the margin of the lid to the lower orbital rim, was done subcutaneously. Three sutures were then passed thru the ciliary border of the lid and the lid pulled as far upward as possible over the upper lid and secured in this elevated position by anchoring the sutures in the tissues just below the brow. To raise the inner canthus and to restore the functions of the lacrimal apparatus by bringing the punctum into apposition with the globe a flap was cut from the root of the nose, after the method of Hassner, and sewed into the tissues just subjacent to the lower lid margin, being superimposed upon an area which had been previously denuded of skin for its reception, the flap being so shaped and devised that it exerted an upward and inward traction upon the lid in the cicatrizing process. The sutures which dragged the lower lid upward were removed at the end of ten days. Cosmetically the results of this double procedure were very fair. Lacerimation, however, persisted, and the palpebral portion of the lacrimal gland was removed, without, however, exercising any marked improvement on the tearing. The removal of the entire gland was therefore decided upon and was accomplished without accident.

#### **Presentation of Original Hays Knife-Needle.**

DR. WM. CAMPBELL POSEY presented to the college a Hays knife-needle

which had been the property of its designer, the late Dr. Isaac Hays, and used by him years ago. The instrument had passed into the possession of his son, Dr. I. Minis Hays, who had given it to Dr. Posey. A description of the instrument as published by Hays in 1855 is as follows:

"This instrument from the point to the head, near the handle, is six-tenths of an inch; its cutting edge is nearly four-tenths of an inch. The back is straight to near the point, where it is truncated so as to make the point stronger, but at the same time leaving it very acute, and the edge of this truncated portion of the back is made to cut. The remainder of the back is simply rounded off. The cutting edge is perfectly straight and is made to cut up to the part where the instrument becomes round. This portion requires to be carefully constructed, so that as the instrument enters the eye it shall fill up the incision and thus prevent the escape of the aqueous humor."

Dr. Posey referred to a paper by S. Lewis Ziegler, on the "History of Iridectomy," which contained a description of all the instruments which have been devised at various times for incision of the iris, and said that the knife-needle designed by Ziegler is a modification of the pattern devised by Hays. Dr. Posey said that he preferred the Hays knife, or Ziegler's modification of it, to another form of knife-needle.

Dr. Hays, who was born in Philadelphia in 1796 and died in the same city in 1879, was one of the foremost as well as one of the earliest ophthalmologists of America. He graduated in medicine at the University of Pennsylvania in 1820 and soon after devoted himself to ophthalmic practice. In 1822 he was appointed a surgeon to the Pennsylvania Infirmary for Diseases of the Eye and Ear, and a similar distinction was conferred upon him on the organization of the Wills Eye Hospital in 1834. He served the latter institution for twenty years. In addition to being the designer of the Hays knife, Dr. Hays successfully edited three American editions of Lawrence's *Oph-*

*thalmic Surgery*, in the last of which, published in 1854, Dr. Hays recorded the first case of astigmatism reported in America. In addition to his ophthalmologic pursuits, Dr. Hays was much interested in natural history, but he is perhaps best known to posterity by his long tenure in the editorship of the *American Journal of the Medical Sciences*. He was for many years a Fellow of this College and greatly interested in its welfare.

DISCUSSION.—Burton Chance wished to express his thanks to Dr. Posey for the donation of the Hays knife, and he trusted that it will be preserved in the about-to-be-formed "historical museum" of the Section. Ever since his undergraduate days Chance has been interested in the Hays knife, for it was one of the instruments recommended by Dr. Ashhurst, and was figured in his text-book of *Surgery*, in the chapter on Diseases of the Eye, which students had to study in their preparation for graduation, as at that time ophthalmology was subject to general surgery in the curriculum of the University.

He called the attention of the Fellows to the fact that Hays devised his knife for the treatment of mature senile cataract. At the period of its invention, 1850, the procedures for the extraction of the entire lens were regarded as dangerous and were to be resorted to only under the greatest necessity. The knife would be used, therefore, repeatedly for the solution of the solid lens. Many and varied were the needles used for the purpose, besides those suitable for reclamation, but none were so simple as that devised by Hays. Having seen the instrument used, with such beneficial effects, for other purposes in the hands of so many of his teachers and friends, he said that he was astonished to find, in 1911, that it had only recently been introduced, in the form of the so-called Ziegler modification, in a certain hospital in England, the ophthalmic wards of which were then in charge of distinguished ophthalmologists. He could then understand why capsular after-cataracts were so rarely discinded by his English confrères, whose arma-

mentarium contained, however, ground-down von Graefe's cataract knives. With the image of this simple knife-needle before him he wondered how it was found possible to manipulate a blade which was in effect a lengthy triangular lance.

The specimen shown tonight, Chance noticed, had been made in France. Now, Hays lamented that his first knives were unsatisfactory. Those entrusted to a famous London instrument maker were impossible, and those developed by a French cutler were but little better. But Kolbe, of Philadelphia, formerly an employe of Luer, was able to fashion one so exactly as to receive Hays' praise. This may not be uninteresting to those who are mindful of Philadelphia's position in the medical world.

It is perhaps not out of place here to speak of the knife which Dr. Ziegler modestly claims to be a modification of the Hays' knife. A comparison between the specimen exhibited tonight and Dr. Ziegler's latest pattern will show that they are not at all similar, and in Chance's opinion the Ziegler knife-needle is a distinctly separate device.

#### Temporary Obstruction of Central Retinal Artery.

DR. GEO. H. CROSS reported the case of E. P., aged forty-eight years, white (English), patternmaker. Past medical history, rheumatic fever twenty-five years ago. Present illness, last July was ill during the night with a severe headache, on the next day he could not talk well; he worked at his trade for a while, when his right hand became weak and he had to give up work. He lost the power of movement in the right side of the face and arm, with motor difficulty in speech; complained of failing vision in left eye. Laboratory examination: Wassermann, negative; urine, negative; blood-pressure: systolic, 138; diastolic, 98.

Examination December 10, 1919: Left eye—vision could not be recorded, due to mental condition; pupil reacts promptly to light and convergence; media clear; disc round; margins fairly sharp; central physiologic de-

pression; lamina well seen; margins of physiologic depression encircled by small artery on the rim; disc congested, blood vessels full, swollen and tortuous. At the moment of observation there was a sudden break in the descending temporal artery, this break resembling in appearance the separation often seen in the mercury column of a thermometer. When first observed this blanching of the artery was noticed on the disc and slowly moved over the edge, increasing until it was about a disc diameter in length; there was a pause, when suddenly the empty area moved forward, the vessel walls being completely filled, and pushing this area forward. Being accurately focussed on this vessel during the entire time the phenomenon lasted, the very interesting fact was noted that when the vessel was empty of blood there was no apparent change in its caliber; it remained like an empty cylinder, with no tendency of the walls to collapse or be dented. The forward progression of this area was slow and uninterrupted until a bifurcation in the vessel was reached, where it divided, with part going to each branch, the following blood column in each branch was unbroken and gradually pushed the empty areas toward the periphery, where they disappeared; in no other vessel was this phenomenon observed; there were no hemorrhages or other lesions in the fundus. This eye has been examined many times since, but only once was this interesting condition observed.

About January 1 more marked signs of cerebral disturbance were observed. These attacks increased so that on February 18 of this year, after several attempts at violence to members of his family he was committed to the State Asylum for the insane, after an examination by a board of physicians.

**DISCUSSION.** Dr. Schwenk asked Dr. Cross if the empty vessel could be seen? He cited a case where he had made a picture for Dr. Geo. C. Harlan, who reported a case in 1887 at the American Ophthalmological Society, where the retinal vessels were empty and invisible, showing that the presence of the blood in the vessel is nec-

essary in order that the bloodvessel can be seen.

Dr. Hollaway stated that he had always been very much interested in changes of this character and had been fortunate enough to see an unusual series of these cases, some of which had been placed on record by Dr. de Schweinitz and himself. He had also seen one of the cases reported by Harbridge. He then exhibited drawings of two eyes, in one of which an anastomotic vessel had formed after the occlusion of an arterial branch. He referred to the interesting obscurations of vision that sometimes preceded occlusion of the vessel and referred to a patient, now under observation, where these attacks had been occurring about every ten days for many months. Despite the objections of certain observers he felt that spasm of the vessel could not be excluded. After alluding to certain conditions such as Raynaud's disease, he referred to the observations on Trench Foot by Sweet, Norris and Wilmer. They believe this condition to be dependent upon an incomplete spasm of the arterioles in the foot which results in localized increased blood pressure. In the absence of thyroid extract they used potassium iodid in the treatment of fifty-three cases, with the most gratifying results. The patient with long-continued attacks of temporary obscurations of vision had been given thyroid extract for a considerable period of time, but with negative results.

#### **Acute Amblyopia from Wood Alcohol.**

DR. ERNEST B. MONGEL (by invitation) reported a case of acute amblyopia due to methyl alcohol. The patient, a male, aged twenty-one years but recently discharged from military service, had only occasionally indulged in alcoholic drinks. On Christmas Eve, 1919, he took three drinks of supposed whisky and on the following day three more. He recalled a foul ether-like odor and taste.

Within thirty-six hours he awoke without light perception or projection. Patient seen twelve hours later. Pupils were equal, round, moderately dil-

ated and faintly responsive to light; tension normal; conjunctiva deeply injected and marked distention of anterior scleral veins. Media of both eyes were clear. The ophthalmoscopic picture was that of a severe and widespread toxic neuroretinitis. The edematous cloud extended well outward from the nerve into the adjacent retina. Veins were very dark, engorged and tortuous.

Differential diagnosis included diseases of orbit, accessory sinuses of the nose, of brain, of metabolic disturbance, of various systemic poisons, and of the infectious diseases. Blood examination showed only slight lymphocytosis. Wassermann and von Pirquet were negative. Sinuses were negative and urine showed only a trace of albumin, with a few hyalin casts.

Patient was admitted to the Episcopal Hospital. Treatment was as follows: Absolute rest in bed, gastric lavage; liquid diet; elimination by salines thru bowels. Pilocarpin, gr.  $\frac{1}{2}$  hypodermically, and hot-packs daily. Supportive treatment, with strychnin, gr. 1-30, t. i. d. Alkaline therapy, calcium chlorid, grs. x (four times daily). After two days' treatment he recognized fellow-patients, and upon discharge at the end of six days vision was 20/50. From this time there was a progressive improvement in all symptoms, until on March 2, corrected vision was in each eye 20/30.

Reference was made to the methods of manufacture of methyl and ethyl alcohol—and emphasis placed upon the slow elimination of the end product of oxidation. Formic acid, which is a normal urine constituent, is excreted in much greater quantities after ingestion of wood alcohol. The following conclusions were drawn:

1. That methyl alcohol is a violent and deleterious poison, producing in the optic nerve and retina the same functional disability or destruction which characterizes the intake of other toxic substances.

2. That since it is slowly eliminated from the body, and an end product of oxidation, as formic acid, also a poison, instead of the rapid and more or less

complete oxidation with acetic acid as an end product, it is much more dangerous in the general circulation than the ethyl alcohol as causative factors in amblyopias.

3. That its specificity of toxic action on the optic nerve is manifested clinically as two distinct types: (a) Neuroretinitis; example, case reported. (b) Retrobulbar neuritis, with its sector atrophy involving the papillomacular bundle of fibers.

4. That the acute amblyopia is probably an interstitial inflammation of the optic nerve associated with intense edema and serous infiltration, nature trying to neutralize and dilute the poison. As an analogy Dr. Mongel offered the example of poisoning with poison nettles or bee sting, also due to formic acid and followed with edema and swelling. The latter types seem to be the hopeful ones from a prognostic standpoint. By proper treatment, promptly administered, the pressure is removed from the nerve fibers and thereby saves them from atrophy.

5. That those cases in which the pressure is allowed to persist or in which the toxic action is specifically on the ganglion cells of the retina and the fibers of the nerve, are represented clinically by an absolute central scotoma and an atrophic temporal half of the nerve. These are hopelessly blind, as medical treatment has been of no avail in such cases.

DISCUSSION. Dr. S. Lewis Ziegler commended Dr. Mongel's use of calcium carbonat to relieve the acidosis, altho sodium bicarbonat in larger doses, well diluted, might have yielded more prompt results. Wood alcohol oxidizes first to formaldehyd, which is corrosive, and next to formic acid which is more corrosive. The latter, if passed in the urine, will reduce Fehling's solution just like sugar, and might lead one to a false diagnosis of diabetes.

The three methods of poisoning are by ingestion, inhalation and absorption thru the skin. Tainted toilet preparations are most dangerous, but the "antifreeze" mixtures used in motor engines are a close second.



Dr. Robinson, city chemist, has given us a new test that is sensitive when as little as 1-100 of 1 per cent of wood alcohol is present. He renders the solution alkaline, oxidizes by potassium permanganate, adds equal parts of milk, hydrochloric acid and water and gets a permanent pink color if any methylic alcohol is present.

Altho grain alcohol can be produced cheaper than wood alcohol it costs more because of the tax. Denatured alcohol is the cheapest but contains disagreeable compounds. Hence the resort to wood alcohol. Dr. Edward Martin, State Commissioner of Health, should be commended for holding down the profiteers by requiring affidavits from every manufacturer and jobber in Pennsylvania that his preparations are made from grain alcohol and not from wood alcohol. The treatment should include alkalies, lavage, enemas, pilocarpin and strychnin. If the retina and optic nerve fibers are not too seriously injured negative galvanism may restore their function.

Dr. Holloway thought Dr. Mongel would be interested in the observations of Fridenberg, who believes that the blindness in these cases results from formaldehyde or formic acid in the circulation. In a patient observed by Gifford, blindness was also attributed to formaldehyde, but in this instance supposed to be generated by burning methyl alcohol. It was also pointed out that under present conditions the type of individual coming under observation was apt to be entirely different from former days. Prior to prohibition many of the individuals who would be apt to drink concoctions containing methyl alcohol were confirmed alcoholics, but at the present time, individuals who seldom touch liquor might be blinded as the result of the unusual drink which chanced to be adulterated.

Dr. Chance, in commenting upon Dr. Holloway's remarks upon the difference in effects in different patients, said it might be of interest to be told of a case of blindness which was under Chance's care in 1918. A Slav met a fellow countryman whom he had not seen

since he left the old country. To celebrate their reunion they determined to get drunk. They went into a tavern, in the mining regions, asking for the hardest liquor to be had. The man had no recollection of when he left the bar, when he waked up in a hospital several days later, but he was hopelessly blind. When he came under Chance's observation there was barely light perception, because the nerves were china white. The other man went on his way apparently unaffected.

#### **Mercurophen in Ocular Conditions.**

DRS. T. B. HOLLOWAY and A. G. FEWELL, in a preliminary report concerning mercurophen, stated that in the study of the chemotherapy of mercurial compounds, Schamberg, Kolmer and Raiziss produced a substance, (sodium oxymercury-orthonitrophenolat, or No. 99) which they found to have marked germicidal action. It occurs in the form of a brick red powder, freely soluble and when used in diluted solution has an amber color; it contains 53 per cent. of mercury. In a menstrum of broth this compound was found to be fifty times more active than mercuric chlorid and two hundred times more active when used in a menstrum rich in protein, such as serum or ascitic fluid. Further, it was found efficient in sterilizing the hands in a dilution of 1 to 40,000 after an exposure of one minute. The substance is less toxic than bichlorid and is free from its corrosive action on metals.

At a joint meeting of this Section with the Section on Otology and Laryngology, in December, 1917, one of us referred to the use of this compound in dacryocystitis. Its use was continued in various types of cases until the war intervened. While the compound is not actually on the market at the present time, it is available in quantities for certain purposes and inasmuch as our earlier experiences with it led us to believe that it would prove to be of value to the ophthalmologist or ophthalmic surgeon, we have again employed it in appropriate cases during the past six months.

Still more recently it was deemed advisable to employ it in a series of corneal, conjunctival and lacrimal sac cases

and at the same time carry on certain laboratory investigations in regard to it, with the hope of possibly ascertaining in just what cases it was most efficient and also to compare it with certain other preparations, old and recently introduced, for which strong germicidal activity has been claimed. With this idea in mind Dr. Fewell has been culturing those cases of corneal ulceration, conjunctival and sac infections that have come under observation in my clinic at the Wills. Needless to say a series of cases such as we desire is built up slowly, and still more unfortunately we have already experienced difficulty in keeping the patients under adequate observation. If conditions are such that the work now under way can be successfully completed, we shall compare our clinical observations with the laboratory findings in a series of corneal, conjunctival and lacrimal sac cases.

While mercuraphen has been used in many cases of different types, judging from his clinical experience with it, Dr. Holloway stated that he felt he was safe in saying that it was particularly efficient against the pneumococcus. Sac cases clear up very rapidly when treated with it. He had also seen good results in those cases associated with corneal ulcer, altho it had not been used in any case of true *ulcus serpens*. In referring to the laboratory experiments now under way. Dr. Holloway stated that the results obtained would be due to the painstaking work of Dr. Fewell.

#### **Paralysis of Sixth Nerve with Otitis Media.**

DR. WILLIAM ZENTMAYER presented the following case of Gradenigo's Symptom-Complex. C. S., aged thirty-two years, a milk dealer, had an attack of otitis media beginning January 3, 1920. When seen by Dr. George M. Marshall in consultation with his family physician, Dr. C. B. Schoales, on January 19, there was a copious thick purulent discharge and the upper and posterior wall of the canal was bulging. There was neither tenderness nor pain over the mastoid. A simple mastoid operation was done January 23. A free incision was made into the membrane and the entire mastoid excavated to the lateral sinus, but this was not

exposed. The cells were very large even to the tip of the mastoid, and were filled with pus. A free incision was made into the middle ear by way of the aditus so that with syringe water passed freely thru middle ear and canal. Drainage with rubber tube was made in the mastoid region. The patient was freed from pain but on the night following the operation had trouble with the left eye. Paralysis of the external rectus was noticed the next morning. Drainage continued free posteriorly for ten days when it ceased.

On March 8 there was a complete paralysis of the external rectus. No other motor palsies. There were no fundus changes and the visual fields were normal. Vision R. E., = 5/10; L. E., 5/15. + 1 c. ax 90° gave 5/4 in R. E. and 5/5 in L. E. The patient had had considerable, but not intense pain over the eyes and in the temporal region. In many of the cases of paralysis of the external rectus with otitis media there has been also intense and persistent pain localized, not as ordinarily in the mastoid region, but in the frontal, temporal and parietal regions on the same side. To this group of symptoms the term Gradenigo's symptom-complex has been given. It is not necessary that the mastoid should be involved. Without going minutely into the anatomical details of the structures involved it may be pointed out that according to the description given by Wheeler, the abducens nerve after piercing the dura passes upward and forward and for a distance of 2 or 3 mm. is enclosed by an areola of connective tissue. Just in front of this it is found in contact with the periosteum at or near the apex of the petrous portion of the temporal bone at which point it enters the cavernous sinus. The small area of contact of the abducens with the petrous bone is marked by a little groove on either side of which is a spicule of bone and stretching closely over the sixth nerve is a firm ligament. To this ligament is attached the dura mater and the connective tissue layer which the nerve penetrates. According to Wheeler it is in this area that an exudate or hemorrhage or edema would be likely to interfere with the function of the abducens

by pressure or strangulation. The pain in the area of the trigeminus is explained by involvement of the Gasserian ganglion which lies in Meckel's dural cavity and rests in a depression on the anterosuperior aspect of the petrous pyramid at its tip. It is therefore likely to become involved in any process which would affect the sixth nerve at this point.

The infection of the tip of the petrous may occur along one or more of several routes. Extension from the tympanum below the labyrinth and internal auditory meatus to the tip of the bone. From the mastoid antrum thru the subarcuate fossa, or by the carotid canal or thru a layer of cells extending along the Eustachian tube, thus passing from the tympanum to the petrous tip.

Webster points out that in some cases the paralysis of the sixth nerve has been observed after the mastoid operation has been performed, and he believes that the operation may be the chief causative factor in producing conditions at the point of contact of the sixth nerve which would produce pressure paralysis from hemorrhage or edema.

The paralysis may clear up in a few days and may clear up at once following mastoid operation, but it usually persists for weeks or months.

#### **Spontaneous Absorption of Lens.**

Dr. J. Hiland Dewey reported the case of J. A., aged thirty years, female, married, first seen February, 1918. At that time she complained of pain in the left eye, severe occipital pain and excessive dizziness, could not go about without an attendant. At this time vision in the eye was down to light perception; light projection very faulty. Had been seen by an oculist six weeks before, when the pain first started, and was told the eye was all right, but patient states that sight was good at that time.

The pupil was fairly dilated, very sluggish to light, tension normal, anterior chamber slightly shallow. Only a white reflex could be obtained from the fundus, very slight haze in lens down and in; transillumination satisfactory. The haze in lens was progressive and in about four months the lens was completely cataractous.

Wassermann, negative, von Pirquet positive. Patient all this time was very weak and greatly prostrated on the least exertion. Had tuberculin, potassium iodid and injections. Pain in eye and occiput together with the dizziness gradually disappeared.

In August, 1919, patient was positive there was an improvement in vision and was anxious for an operation. Light projection became perfect and shadows could be detected. At this time there was a return of pain in eye and occiput and some dizziness.

In December, 1919, there was a change in the appearance of the lens and about two weeks after it could be seen that the lens was beginning to break up into numerous irregular flocculent masses. There was no history of traumatism nor could any trace of a tear in the capsule be detected. Absorption has continued rapidly and at this date March 19, 1919, there remained only three or four small flocculent masses and the nucleus sinking behind the iris down and in. Perfect view of fundus can be obtained which appears normal in all respects. Vision with correction 5/15.

What the nature of the original pathologic change was Dr. Dewey could not say, but the cataract developing subsequently seems to have certainly undergone spontaneous absorption.

During this time patient lost no weight but has gained ten pounds in the last six weeks.

J. MILTON GRISCOM, M.D.,

## ABSTRACTS

Grüter, W. **Optochin in Diseases of the Eye, Especially Serpent Ulcer.** Zent. f. d. g. Oph. u. i. Grenz. 1920, v. 3, p. 81.

The author, in an article well fortified by tables and case reports, with numerous references to the literature, goes very thoroly into the subject of the use of optochin. He discusses it under the headings of, (1) The results of experimental investigations; (2) Clinical results; (3) Causes of abandonment of optochin therapy and attempts to improve the action of the remedy; and (4) Comparison of the chemotherapy of *ulcus serpens* with other methods of treatment. His conclusions are:

Optochin is a specific against pneumococci, and has a destructive, tho less powerful, action on the streptococcus viridans. The action can be demonstrated both by animal experimentation and test tube experiments. The action of the remedy is greatly influenced by the temperature and length of the experiment. Addition of serum in the test tube precipitates albumin, and considerably restricts the action of the drug. Pneumococci freshly cultivated from the ulcer, or the conjunctiva, have more than 100 times the resistance to optochin than have laboratory strains; but even the freshly prepared strains show variations in their resistance. The bactericidal action of optochin is not noticeably influenced by increase in the virulence of the pneumococcus.

The solutions should be freshly prepared, as they are not stable for more than 14 days. The combination of optochin hydrochlorid with atropin sulphat is to be avoided, because of the formation of an insoluble optochin sulphat. Solutions of less than 1% are of no value in ulcer therapy, or sterilization of the conjunctiva. In ulcers with deep infiltration, it is of value to use repeated applications of 5% optochin for 5 minutes. Stronger solutions cause cauterization of the cornea and conjunctiva. Intralamellar injections, and injections into the anterior

chamber are to be avoided. Use of 1-2% solution of optochin for a couple of days will free the conjunctival sac of pneumococci for at least two days. In the treatment of dacryocystitis, optochin has only a transitory effect. The results of optochin therapy of *ulcus serpens* depend on the location of the pneumococcic focus. The deeper the infiltration, the less the benefit.

After a long use of optochin, a not unimportant irritation or cauterization may appear. Especially is this true in iritis, where there is danger of exacerbations with secondary glaucoma from the formation of a synechial ring. Repeated use of optochin causes scanty regeneration of the epithelium, which can lead to reinfection. The time of treatment is not appreciably shortened by the use of the drug. The contraindication to the use of optochin is not due to an optochin immunity of the pneumococci of the ulcer, but to lack of penetrating action and this is due to the precipitation of albumin by the drug. The remedy is not contraindicated by the treatment of ulcers by more penetrating drugs.

C. L.

Fleischer, B., and Niesenhold, E. **Traumatic Reflex Immobility of the Pupil.** Klin. M. f. Augenh., v. 64, January, 1920, p. 109.

While in tabetic reflex immobility of the pupil the disorder probably lies in the transit from a subcortical receiving center to the motor nucleus of the sphincter, in the traumatic cases it generally is due to disturbances of the conduction of the motor impulse to the sphincter, i. e., mostly residuals of a more or less complete paralysis of the third nerve in its stem, partly also in its intracerebral section. In some cases it was observed after direct contusion of the eye.

After a review of the literature a case is described in an otherwise healthy girl, aged 17, seen 6 days after her left lower lid was struck by a hay fork. Complete paralysis of the oculomotor nerve, pupil wide without reac-



tion, abducens and trochlearis functioning, disc not sharply defined, surrounding retina opaque.  $V. = 5/12$ . The other eye normal. The condition improved to a certain extent. After 13 months the temporal portion of the disc was pale,  $V. = 1$ . Normal field, some diplopia.

There was no reflex immobility, but an incomplete absolute unilateral immobility with almost complete abolition of direct and diminished consensual reaction to light; impaired accommodation and partial persistent paralysis of exterior muscles, caused by an orbital injury, similar to a case of Laqueur. The consensual, altho incomplete, reaction with almost entirely lacking direct reaction, is attributed to the partial optic atrophy, inhibiting the conveyance of the light stimulus, and not able to arouse the function in the damaged light reaction fibres of the oculomotor nerve. The prompt consensual reaction of the other pupil proved that the transmission of the light stimulus in the optic nerve was not suspended.

The authors are tempted to assume that in this case a special damage to the pupillary fibres of the optic nerve occurred. They believe that also in the other traumatic cases the seat of the disturbance must be sought in the periphery, mostly in the orbit. On account of the almost missing direct, and insufficient consensual reactions the authors assume a rather feeble impulse of convergence, thru the existence of special convergence fibres, which escaped the injury, which damaged only the light-reaction fibres. The lesion might have damaged the ciliary ganglion, so that the finer transfer of the stimulus in the ganglion was rendered difficult or impossible; but the fibres penetrating, or passing by the ganglion, viz. the supposed convergence fibres, were not affected.

C. Z.

**MacCallan, A. F. Glaucoma in Egypt.** Report of the Director of Ophthalmic Hospitals in Egypt, 1917.

The total number of cases of primary glaucoma examined in the Government

Hospitals of Egypt in 1917 was 2,444. The operation of trephining with iridectomy was the operation of election. Iridectomy alone was done 374 times, and trephining with iridectomy 2,550.

During the last six years 448,086 patients have been examined at the ophthalmic hospitals of Egypt, and of these 9,686 patients, or 2 per cent, were found to have signs of glaucoma. Full clinical notes of all these cases are in existence and can be referred to if required.

Cases of acute glaucoma are rarely seen, only 71 having applied for treatment during the last six years. Cases of subacute glaucoma are rather more frequent, 131 cases having been seen during the same period. The high percentage is made up almost entirely of chronic glaucoma, about half of whom do not apply for treatment until blindness has supervened, more than one per cent of all the patients who seek treatment at the ophthalmic hospitals being already blind in one eye or both eyes from this disease.

**Löwenstein, A. Experimental Transmission of the Virus of Febrile Herpes.** *Klin. M. f. Augenh.*, v. 64, January, 1920, p. 15.

Löwenstein proved by experiments on rabbits the difference between two such similar affections, as febrile herpes and herpes zoster of the cornea. He inoculated from the vesicles of febrile herpes of the lip, chin, forehead, and ear, of different etiologies, or virus into the corneas of 17 rabbits, producing in all an affection similar to human herpetic keratitis. The most different control investigations with the contents of vesicles of burns, eczema, pemphigus, etc., and of herpes zoster, were negative.

The virus does not lose its virulence by transmission from the cornea of one rabbit to that of another, or even a third or fourth rabbit. From the primary mixture of the contents of the vesicles in 5 cc. salt solution, weaker solutions to 1:200 were made and proved infectious. The virus is very labile, loses its activity by heating for half an hour to  $56^{\circ}$  C. in the water

bath, and after 24 hours in the incubator. It could not be derived from the blood of patients affected with herpes.

Very fine granules of different sizes are found in the spreads, which were missed in control specimens. Their pathogenic nature cannot be asserted so far. In spite of negative results of filtration experiments, it is probable that the virus may pass thru the Berkefeld filter. Recovery from an inoculation herpes, leaves, like affections by chlamydozon, a histogenous local immunity.

The inoculation keratitis is an infiltration of the parenchyma of the cornea with polynuclear leukocytes leading to colliquation. In the stratum directly exposed to the virus Löwenstein found cystic degeneration of the epithelium, formation of vesicles, melting of Bowman's membrane, and glassy anuclear mortification of the upper layers of the parenchyma. C. Z.

**Barraquer y Barraquer, I. Modern Extraction of Cataract.** La Clinique Oculistique, April, 1919.

After a general review of the operations for cataract extraction now practised the writer concludes that the aseptic technic must be applied to the seat of operation, the utensils and instruments, the operator and the patient. For the latter he washes the lids with soap, and disinfects the lashes with 4 per cent silver nitrat solution. The conjunctival sac is washed out with physiologic salt solution, which he finds as efficient as the antiseptics sometimes employed. He operates in sterilized cotton gloves. The upper lid is raised on a Desmarres' elevator, the lower controlled with the fingers and the eye fixed with forceps of Landolt. The most complete operation, he thinks, includes a conjunctival flap with a suture. Iridectomy should be avoided, but if thought to be necessary the peripheral iridectomy may be used. He employs eserine to produce miosis after the operation, having previously dilated the pupil with euphthalmin. The lashes may be smeared with a sublimat ointment, but need not be

cut off. The dressing is to be confined to the region of operation.

The best method of extraction is by phacoerisis (from the Greek "phakos" (lens), and "erio" to draw out), removal by suction; which he began in ignorance of the earlier cases of Hulen, and of that of Coderque published subsequently, which was confined to the eye of a dog. His operation, illustrated elsewhere (page 721), is done with the instrument called an erisiphake. This consists essentially of a handle into which is fitted a hollow tip cupped to apply the vacuum to the front of the lens. To this is attached by flexible tube a suction pump with a regulating chamber capable of quickly establishing and maintaining a vacuum equal to at least 50 mm. of mercury. The tube of the tip can be instantly connected with this vacuum or with the atmosphere by the spring valve in the middle of the handle, which is controlled by the thumb. Barraquer dwells on the importance of having all parts of the instrument work quickly and smoothly. The vacuum may be secured from either one of several pumps worked by electric power that are now on the market, for other uses.

E. J.

**Roelofs, C. O., and Zeeman, W. P. C. Visual Acuity in Reduced Light.** Tydschr. v. Geneesk., June 14, 1919.

These writers would unravel some obscurities of night blindness by an elaboration of our physiologic knowledge. In this connection the meaning of night and twilight must be determined by the strength of the illumination and the strength of contrast between different objects. This being determined the question arises as to the sensibility requisite at night and in twilight. The threshold of the light sensibility must be determined, and the visual acuity under weak illumination and slight contrasts. Conditions of mind and body must not be overlooked. Therefore, besides the adaptation power, the construction of the eye, the clearness of the media, and pupillary width, we have to consider exercise, fatigue, concentration of attention, etc.

Yntema has determined, at the Astronomical Laboratory at Groningen, the quantity of light which reaches the Netherlands on a cloudless night in March or April. This could be estimated at 0.00057375 Meter candles (M. C.). Suppose the starlight is evenly divided a horizontal object will be illuminated most favorably. But as the rays fall at very different angles the actual illumination will not reach 0.0003 M. C.

When we examine the light sense threshold value, after light adaptation, the object can be seen with an illumination of 0.11836 M. C. The threshold value alone is an insufficient measure for the ability to move in weak light, a certain distinction of objects is necessary. An investigation of visual acuity with very weak illumination should be made. It seems that the sensitivity for differences of direction is here of more value than the power to observe two points separately.

Before the milk glass plate of the light sense measure, a glass plate was put with certain opaque objects. (1) A black, 1 cm. broad bar, in the middle of which was a break of 4 cm. In this interspace a rectangle 2 by 1 cm. was displaced 0.1 cm. toward the right or left of the space. A series of squares separated by their breadth 3 mm. A series of squares 1.5 mm. each. Six small parallel lines of 1 mm. wide and 11 mm. long.

With different degrees of illumination of the milk glass plate the distance was now determined at which the objects were recognized in their true aspect after a dark adaptation of 20 minutes.

It was demonstrated that increase of light augments the visual acuity—in fact with arithmetic series with the increase of light; and when perception is near a minimum a more extensive and more accurate investigation must determine if the graph composed of the logarithms of the light strengths and the logarithms of the angles really forms a straight line. With increase of the light intensity the perception becomes regularly smaller and there is a regular increase in the sensibility for

direction differences as measured with the bar. There seems to exist a fixed relation between the smallest observable difference of direction and the angles which represent the perception circle and smallest perception width. With an illumination as from the clear starry heaven the perception circle of Roelofs is about  $1^{\circ} 21'$ ; of Zeeman  $3^{\circ} 15'$ ; and is the smallest difference recognizable for the normal eye for Roelofs  $7' 14''$ ; and for Zeeman  $14' 19''$ , which corresponds with a vision of about  $1/40$  to  $1/50$  by the clinically employed methods.

This acuity found for different illuminations is for sharp contrasts such as between white and black objects. Other values will be found with less strong contrasts. Hulshoff Pol in 1917 made determinations of visual acuity with changing illumination using black or white figures against a series of gray backgrounds. The reflecting power of the white objects was twenty times that of the dark objects. If we want to know on a starry night our vision for dark objects, which only reflect  $1/20$  of the white objects, then we have to conclude from our data how great the acuity for twenty times smaller illumination, that is 0.0003

$$\frac{0.0003}{20} = 0.000015$$

M. C. The above described objects cannot be recognized even at 25 cm. distance.

Visual acuity appears therefore dependent on illumination, but large changes in the illumination are accompanied by relatively small changes of acuity. Only a very small acuity is necessary to allow a free movement in twilight surroundings. This makes it improbable that small deviations in light sensitivity will explain complaints of night blindness. An increase of the threshold value must be a rather important or sole cause of night blindness.

The foregoing conclusions were reached with two emmetropes. It was now necessary to find out how persons with diminished visual acuity thru refraction anomalies or abnormal pupils see with diminished illumination. The

investigations were repeated with lenses, +2, +4, +8, -2, -6 D., or with stenopaic openings. The objects were squares of 8x8, 4x4, 2x2, 1x1, and 0.5x0.5 cm. and 3x3 mm., space between being the same as the squares. The examinee was placed at 5 meters from the test. The smallest light quantity was found wherewith the two squares could be seen separated. It was found that persons with artificial refraction anomalies do not show an altered light sensitivity. The quantities of light necessary for reaching certain degrees of vision are, however, much higher than for the naked eye. Even the strongest illumination was unable to bring the acuity higher than the maximum found for that refraction anomaly. It seems therefore that with such feeble illumination that the emmetrope can orient himself with difficulty, the ametropes are entirely helpless, or in any case is much at a disadvantage. With a small opening before the eye the threshold value is found higher. With higher illumination, however, the sharpness of the image with a small pupil, favorably influenced it.

The clearness of the media has a different influence. Koeppe and Schieck have described a peculiar combination of congenital lowered transparency of the lens with hemeralopia and without other ocular changes, which they demonstrated in ten cases.

In older persons the yellow lens absorbs especially the blue rays; and this with uncorrected hyperopia will explain their tendency to night blindness. Psychical influences, training and fatigue also play their part.

E. E. B.

**Ferree, C. E. and Rand, G. Zones of Color Sensitivity in Relation to Intensity of Light.** *Amer. Jour. Physiol. Optics*, July, 1920, pp. 185-213.

These writers have made an experimental study of the effect of intensity of illumination upon the color fields. The investigation was given the following form. (1) An attempt was made to find out whether by means of

a spectroscopic apparatus, which was designed especially to give high intensities of light, stimuli could be obtained which would be sensed as color to the limits of white light vision. (2) The effect on the extension of the limits and on the shape of the zones of sensitivity of varying the stimuli through quite a wide range of intensities was investigated. And (3) the determination of the limits was made in sixteen meridians with all of the lights made equal in energy to the blue of the prismatic spectrum employed, and with  $1/32$  of this energy.

They found it was quite easy to obtain an intensity of light for the red, yellow and blue wave-lengths that could be sensed to the limits of white light vision. In fact these wave-lengths in the spectrum employed were considerably above the threshold at the limits of white light vision in the sixteen meridians investigated. The limits of the green of this spectrum, however, fell far short of the limits for white light; nor could the zone of sensitivity be widened as much as 1 degree by increasing the current in the Nernst filament from 0.6 to 0.8 ampere.

The bearing of these results on the work of the clinic may be indicated in part as follows: In the practice of perimetry as applied to diagnosis it is commonly accepted that the field of vision for the normal eye may be divided concentrically in the following order: white light and form, blue, red and green. It is obvious from the foregoing results, (a) with stimuli taken from the prismatic and equal energy spectra and (b) from the effects obtained by varying the intensity of the stimuli, that the responsibility for such a rating of the color fields rests for the greater part with the relative intensities of the pigment stimuli used in the work of the clinic. That is, the limits of sensitivity to red, yellow, blue, and white light for stimuli of high intensities are coincident; for stimuli of lower intensities taken from the prismatic spectrum they are rather widely concentric; and for stimuli of equal energies of the order of intensity, roughly



speaking, represented by the pigment stimuli, they are interlacing.

Another feature of interest is the claim that has been made by certain clinicians but not generally accepted, that the interlacing of the limits for blue and red indicates a pathologic disturbance in the relative distribution of sensitivities. It is fair to note that pathologic disturbances are only one set of factors that may contribute to

such a result, and that widely different results may be gotten with the same eye with no greater difference in the test conditions than may occur from time to time in the same clinic or laboratory unless a clear understanding is had of the factors which affect the apparent powers of response of the peripheral retina and adequate means are exercised for their control.

E. J.

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**AMERICAN JOURNAL OF OPHTHALMOLOGY, 7 West Madison St., Chicago, Ill.**

## CATARACT OPERATIONS.

Of devising many operations there is no end, and much study of them is certainly a weariness of the flesh. The opportunity to have one's name attached to some newly discovered disease is limited; but there seems no limit to the number of possibilities for devising an operation or an instrument that will carry it around the world. For one hundred and seventy-five years now, cataract knives and cataract operations have been performing this function for the ophthalmic surgeon.

Ever since Daviel introduced cataract extraction it has been the star operation in ophthalmic surgery. There have been countless modifications, developments, even fashions in the ways of performing it and the instruments used. This is in harmony with the importance of the procedure, the different points of view from which successive generations approached their work, and the certainty that real progress in surgical methods will continue to be made in the future as in the past.

This movement is illustrated in the present issue of this JOURNAL. For

seventeen years the "Smith-Indian" operation for extraction of the lens in its capsule has been before the profession, and during that time has given rise to a very considerable mass of literature. As is usually the case with any new procedure, the great bulk of this literature has been favorable to it. Those who think the operation an important advance give it the most attention and write about it. Those who think it unimportant or inferior to other methods give it less thought, and incline to let it pass into the oblivion they think it deserves. Only when its advocates are felt to be unreasonable and annoying in their claims or suggestions, does an aggressive voice or pen support the negative.

An absolutely new procedure that very few have tried, or have even seen or thought about, cannot be judged by its popularity. But the value of a method that has been long enough before the profession to be widely discussed and tried, may be fairly estimated by the proportion of those, who having tried it or seen its results in other hands, take it up and continue to use it. When this verdict has been ob-

tained, it is not likely to be changed. Only a modification that changes the character of the operation introducing new elements and problems is likely to alter it. It must be admitted that the great majority of ophthalmic surgeons have for their own work decided adversely to the Smith-Indian intracapsular extraction.

In the case of extraction of the lens in its capsule, the introduction of suction, to seize the lens and shake it loose from its attachments, may be the modification that will reawaken interest and furnish a new starting point for debate. It is ten years since Hulen described a method of catching the lens in a vacuum cup. But he did not perfect the apparatus for making and sustaining a controllable vacuum; as Barraquer has done since. So that the operation proposed by the latter may be regarded as one on which the profession in the greater part of the world has not yet had the opportunity to pass an intelligent judgment. What that judgment will be, only time will show.

Before any new procedure has been fully tried, and the general verdict of the profession upon it has been made manifest, each operator who deals with cataract, and endeavors to keep abreast of the advances in ophthalmology, must carefully consider each new proposal and decide whether it appeals to him as probably an advance. In such consideration his own experience and certain general principles unite to render a tentative judgment. This judgment may need later to be reversed; but at the start one who knows the behavior of the eye after operative injury must and can rest on it with some confidence.

It is certain that intracapsular extraction will never be adopted on account of the arguments based on false premises; that have been put forward in its favor, not so much by Col. Smith as by some of his followers in search of some new argument in favor of the method.

It will not be accepted because operation for "capsular" or "after" cataract is always required, or is danger-

ous. There can be found in the literature statistics that show the operation for secondary cataract may be dangerous. But since the introduction of the knife-needle thru the vascular limbus, rather than thru the clear cornea, has been practiced, the operation is practically devoid of danger from infection. When the capsule is left in the eye it frequently permits as good vision, without any secondary operation, as is obtainable by the intracapsular operation. In about half the cases the second operation is not needed.

Intracapsular extraction cannot be advanced as the only method of extracting unripe cataract. Before its introduction most operators had extracted unripe cataracts with capsulotomy; until they had found this operation about as safe as for mature cataracts. Often the unripe cortex disappears entirely without further interference, before the eye has passed thru the period of rapidly changing postoperative astigmatism, and can safely be used for ordinary occupations.

Neither is the intracapsular method the only way to avoid the postoperative inflammation due to the presence of cortex in the anterior chamber. Opening the capsule at its periphery as was done by Herman Knapp for many years before his death, or such opening by the linear cut with the cataract knife, practiced by the writer, gives equal immunity from postoperative inflammatory reaction. Even washing out of the anterior chamber, as resorted to in various ways, gives much the same immunity.

Intracapsular extraction can never be established in the favor of the profession by accusing the "capsulotomy method" of faults that are not necessarily connected with it. But this does not imply that under certain circumstances the removal of the whole lens, including its capsule, at one operation may not often offer great practical advantages over any operation the full advantages of which require the patient to remain under observation for a considerable period. It is possible, too, that the suction method of Barraquer may prove to be an improved

or perfected intracapsular method; and free from dangers attending pressure required to rupture the suspensory ligament of the lens, and so it may bring intracapsular extraction into more general favor.

The seriousness and formidable character of cataract extraction depend largely on the length of the incision required to furnish adequate outlet for the senile crystalline lens. Discission, linear extraction, or the old suction operation on a soft lens, are much less formidable. Iridectomy is nothing like so serious a menace to the health of the eye. It can be predicted with probability that the next radical change proposed for the operative treatment of cataract will be some method of cutting to pieces, or crushing, the firm nucleus; permitting the removal of the lens thru a relatively small opening. The crushing of stone has largely replaced lithotomy, which in some ways corresponded in general surgery to cataract extraction in ophthalmology. A carefully worked out technic, that would make possible removal of the senile nucleus of the lens thru an 8 mm. incision, would certainly attract attention and become a starting point for new advances.

E. J.

#### GRADED EXAMINATIONS IN OPHTHALMOLOGY.

America does not always look to "conservative Britain" for radical changes in professional institutions. But it must be admitted that in the matter of examinations to test fitness for ophthalmic practice, the Conjoint Board of the Royal Colleges of Physicians and Surgeons in London has taken a decided step in advance of the American Board for Ophthalmic Examinations. It has announced that graduates in medicine with a registrable qualification may at any time enter for part 1 of the examination, which includes the anatomy and embryology of the visual apparatus, the physiology of vision and elementary optics.

This plan has important advantages

over that of requiring the needed clinical experience, as evidenced by attendance on clinics, assistantships, etc., or reports of clinical cases, before admitting the candidate to examinations on anatomy, histology, pathology, physiologic optics and diagnostic methods. For the young man fresh from University and State Board examinations, those on the fundamentals of ophthalmology will seem much less formidable or embarrassing; he will be much more likely to try for the evidence of higher qualification at this time, than after years of freedom from such tests and divergence from systematic and laboratory studies. After attention has been turned to clinical work he will be more disposed to meet requirements of case reports, or the clinical examination into his working methods.

But the great advantage of the divided, or graded examination is that it will emphasize the importance of training in fundamentals, before taking up the clinical work in ophthalmology. Those of us who have grown up under the old regime are far more generally lacking in the fundamental training than in clinical experience. And the defects that exist in our clinical knowledge are closely associated with our lack of fundamental training. There is an enormous waste of the student's time in attempting to follow the work of a clinic, before he knows the anatomy and pathology of the structures involved in the diseased conditions presented. More than that the proper insight into disease never can be obtained without the interpretation that fundamental training furnishes.

There is economy of time by concentrating attention first on certain related studies, and then on others that naturally belong together. The course of study in preparation for medical practice is already too long, as compared with the period of human development and active life; and every change that will economize the students' time should be made. The practical spirit of the American profession should be quick to adopt this improvement in the way of testing fitness for



ophthalmic practice, and of indicating to those who are preparing for it, the rational and effective way to pursue their studies.  
E. J.

### BOOK NOTICES.

**Der Augenhintergrund bei Allgemeinerkrankungen.** By H. Köllner, M.D. Prof. at Würzburg. 8 vo., 190 pp. with 37 illustrations, 27 in colors. Berlin, Julius Springer. Price in paper 38 marks.

This guide for physicians and students gives an excellent account of the changes in the ocular fundus in general diseases. Its scope is somewhat broader than its name implies, for the first dozen pages are given to the technic of the examination, and ten more to the ophthalmoscopic appearances of the normal eye ground. The general pathology of the retina of the choroid and of the optic nerve occupy 25 pages; and then the special pathology of the various diseases is taken up.

Matter relating to special pathology occupies 125 pages. It is classified under infectious diseases including septic and acute infectious diseases; malaria, tuberculosis, and syphilis, acquired and congenital. Then come diseases of the respiratory organs, those of the digestive organs and sexual organs including the ophthalmoscopic changes in the fundus of the new-born. Nephritis, diseases of the circulatory apparatus, blood diseases such as the anemias, the so-called hemorrhagic diathesis, diabetes, exophthalmic goiter, diseases of the cerebro-spinal system, and the nasal sinuses are considered, and also the poisons that produce ophthalmoscopic changes.

There is an adequate index of subjects. No index of authors is needed for no authorities are cited for the statements made, and no attempt is made to credit authors for the various observations given. The book simply undertakes to give what is already common professional knowledge. This is given in brief condensed form, the facts included being generally well chosen. The illustrations are in half-

tone and both in colors and in black serve to give meaning to the descriptions of the appearances to be looked for. Altho the paper has the high finish suiting it for half-tone reproductions, the letter press is also very clear, and the whole work creditable to both author and publisher.  
E. J.

**The American Red Cross in the Great War.** Henry P. Davison. Small 8vo., 302 pp., 7 illustrations. New York, The McMillan Co.

This account of Red Cross activities by the Chairman of its War Council will be of interest to many people; but contains little referring to ophthalmology. It is calculated to bring permanent support to the organization, by spreading a comprehension of the varied emergencies that such an organization can best meet even in times of peace. One of these is the care and re-education of the blinded soldier. What is done for the disabled is here illustrated by the man blinded. "If in the first stage of hospital treatment it is thought possible that his vision will be permanently lost, the work of re-education begins without his knowledge. From that time on,—even while he is yet ignorant of the truth,—the doctors are "teaching him to be blind." While his eyes are still covered with an unnecessary bandage, perhaps, he is taught to do for himself things that the blind do, such as shaving and finding his way about."

"By the time the blinded man discovers the truth the crushing force of the blow has been broken. From that point onward,—on the journey home and at every stage he must pass before the last hope of saving his sight is abandoned,—he, unconsciously, is being trained in the rudimentary lessons of blindness."

A survey of the industries of the country shows that about 3 per cent of the manufacturing industries involve work which blinded men can do satisfactorily. In some branches blind men are more efficient because of their closer concentration and developed sense of touch.  
E. J.

## BIOGRAPHIC SKETCHES.

THOMAS H. SHASTID, M.D.,

SUPERIOR, WISCONSIN.

ALT, GUSTAV ADOLF FRIEDRICH WILHELM. (Ordinarily only "Adolf Alt" was employed by the Doctor himself.) A famous American ophthalmologist, a copious contributor to the literature of ophthalmology, and founder in 1883 of the first ophthalmologic journal published west of New York City. He was born at Mannheim, grand duchy of Baden, Germany, Aug. 13, 1851, son of Dettmar and Maria Alt, the father being a well known physician.

The son commenced the study of medicine in 1869, but, his father dying in 1870, and the Franco-Prussian war breaking out, he enlisted in the 2d regiment of Baden grenadiers. After participating in eleven battles, he returned to the study of medicine at Heidelberg in 1871. In 1872 he migrated to Strassbourg University, but in the following year, returned to Heidelberg, where he received his medical degree with honors, in March, 1875. Having completed his term of military service in the medical department of the 47th infantry, he removed, in September, 1875, to America.

For almost two years he was first assistant to Dr. Herman Knapp, in the New York Ophthalmic and Aural Institute. A part of this time he lectured on the normal and pathologic histology of the human eye.

In 1879 he removed to Toronto, Ont., where, upon examination, he became a member of the College of Physicians and Surgeons of Ontario. He was also appointed lecturer on ophthalmology and otology in the Trinity Medical College. In 1879 he published simultaneously in Germany and New York a volume entitled "The Normal and Pathological Histology of the Human Eye." In 1880 he removed to St. Louis, Mo.

The Doctor's success in the rapidly growing western city is known to every ophthalmologist. His practice was very large and came from many states.

He was author, in St. Louis, of several volumes on the eye, and also of valued articles on ophthalmology which number into the hundreds. In 1883 he founded, and, till its merger in 1918 with the present JOURNAL of the same name, continued to edit, "THE AMERICAN JOURNAL OF OPHTHALMOLOGY." He was also, until his death, a member of the Editorial Staff of this JOURNAL. He was a member of the St. Louis Medical Society, the Missouri Medical Association, and the American Ophthalmological and American Otological Societies. He was one of the founders of the American Academy of Ophthalmology and Otolaryngology. Shortly after removing to St. Louis he was made Professor of Ophthalmology in the Beaumont Hospital Medical College, and later (1901-03) held the same post in the St. Louis University Medical School, and the Marion Sims-Beaumont School of Medicine. About nine years ago he left the last-named school for the Washington University Medical School, which made him Professor Emeritus in 1917.

Dr. Alt was a short, stout man, 5 feet 6 inches high, weighing, as a rule, 180 pounds. His hair was brown, his eyes blue. He wore almost invariably a mustache. A man of decided opinions, he was never quarrelsome, and the strongest condemnation which he passed upon professional brethren was, ordinarily, some such expression as "How are the mighty fallen!" He was extremely fond of animals, of children, of painting and of music. His chief recreation was playing the violin. He founded, and was for a long time president of the Cecilia Society of St. Louis. He was a Republican in politics, a believer in Christ but not a church member.

The Doctor married, in 1879, while still a resident of Toronto, Helena Bogardus, daughter of Dr. D. Hough-taling, of Albion, N. Y. To the union were born two children—Arnold D. and Bertha.

In 1918 Dr. Alt was taken ill. He had been steadily failing, and was a

chronic invalid from myocarditis for two and a half years. He died June 28, 1920. The interment was had at

the Beliefontaine Cemetery and was private. The doctor was survived by his widow and the son.



Adolf Alt. 1851-1920.

## NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities.

### DEATHS.

Dr. Albert Antonelli, a prolific writer for French ophthalmic journals, and a Chevalier of the Italian Legion of Honor, is dead.

Dr. J. Bjerrum, a leading ophthalmologist of Denmark, is dead at the age of 68.

Dr. Charles D. Ferguson, Oklahoma City, Okla., aged forty-five, died in Corpus Christi, Texas, June 11th, from ruptured aortic aneurism.

Dr. Richard Nunn, for many years Professor of Ophthalmology and Otology in the Medical Department of the University of Oregon, died suddenly, recently. Dr. Nunn served in the British Army from the early part of 1915 to the close of the war.

### PERSONALS.

Dr. F. W. Edridge-Green has been appointed a special examiner in color vision and eyesight by the London Board of Trade.

Dr. C. C. Rush, who spent some time in ophthalmic practice in China has returned to the United States, and has located at Johnstown, Pa., with offices at 402 Grove Street.

Dr. Frank Allport's many friends will be gratified to know that after a serious illness, which kept him in the hospital for several weeks, he is convalescing nicely and able to partially resume his office duties.

The Transactions of the Luzerne County Medical Society, Volume 21, has just appeared under the editorship of Dr. Lewis H. Taylor, of Wilkes Barre, Pa.

Dr. Thomas B. Holloway, has been appointed Vice-Dean for the Faculty of Ophthalmology in the University of Pennsylvania; Drs. Luther C. Peter, William T. Shoemaker, William Zentmayer, and L. Webster Fox, Professors of Ophthalmology; Drs. Leighton F. Appleman, and B. F. Baer, Associate Professors in Ophthalmology, and Drs. H. M. Langdon, Oliver F. Mershon, E. B. Miller, E. A. Shumway, G. S. T. Kelly, Albert A. Beck, and Alfred E. Cowan, assistants in Ophthalmology. Drs. A. C. Fewell and John E. Medley have been appointed instructors.

Dr. Gilbert Seaman, of Milwaukee, Wisconsin, has, as a result of much urging, announced his candidacy for the Wisconsin gubernatorial nomination. Dr. Seaman is not only a veteran ophthalmologist in civil life, but he served on the medical corps throughout the Spanish War, and, at the very entrance

of America into the World War, enlisted with the Wisconsin National Guard. With the rank of Major he was made chief surgeon of the 32d Division. Just before the armistice he became chief surgeon of an army corps, with the rank of Colonel. It is much to be deplored that doctors generally do not go more into politics, for Congress and the various legislatures stand in need of the special knowledge and experience of doctors.

### SOCIETIES.

At the Eighth Annual session of the Pacific Coast Oto-Ophthalmic Society held in Portland, Oregon, July 29th to 31st, the following officers were elected: President, Dr. George W. Swift, Seattle; Vice-Presidents, Drs. Edward E. Maxey, Boise, Idaho, and Joseph O. Chiapella, Chico, California; and Secretary-Treasurer, Dr. Ernest C. Wheeler, Tacoma, Washington. The ninth annual meeting will be held some time next June en route to Alaska, on a boat chartered for the purpose. The meeting this year was well attended and was very instructive scientifically.

### MISCELLANEOUS.

It has been known for many years that trachoma has been exceedingly prevalent in a number of sections in Illinois. The State Department of Public Health has completed the preparation of a set of rules and regulations for the control of this disease.

As the Transactions of the American Ophthalmological Society are now in cloth binding, and the cost of printing and producing higher than prior to 1917, the price of the volume is now \$5.00. Orders should be sent to the Secretary, 1819 Chestnut Street, Philadelphia, Pennsylvania.

Lt. Col. F. P. Maynard, who prior to the breaking out of the war was a collaborator of the *Centralblatt für praktische Augenheilkunde*, for a time was dropped from the list on its title page, and to his annoyance finds that his name again appears as a collaborator. He would like his colleagues to know that it was without his consent that his name was again associated with that journal.

A medical examination conducted on behalf of the American Red Cross in Algeria and Tunisia recently, disclosed the fact that in the oasis towns of the Sahara ten per cent of the native population is blind. It showed, too, that the present epidemic of trachoma has



made its greatest headway among the younger children, both native and European. Of 6,025 children examined in different parts of Algeria, 1,650 or twenty-four per cent were trachomatous. Dr. Edmond Sergent, Director of the Pasteur Institute of Algiers, in one small settlement in the department of Oran, found one-hundred and fifty-six trachomatous cases among a total of two-hundred and thirty-six inhabitants.

The law on Ophthalmia Neonatorum which has been enacted by the state of Illinois, is specific enough in its wording to prevent misconstruction or to allow for any excuse for failure to report cases. If the provisions of the two following sections are observed it should do much in eliminating this prolific cause of blindness:

Section 1. Any diseased condition of the eye or eyes of any infant, in which there is any inflammation, swelling or redness in either one or both eyes of any such infant, either apart from or together with any unnatural discharge from the eye or eyes of such infant, at any time within two weeks after birth of such infant, shall, independent of the nature of the infection, be known as ophthalmia neonatorum.

Section 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital, of any nature, or parent assisting any way whatsoever, any woman at childbirth, or assisting in any way soever any infant, or the mother of any infant, at any time within two weeks after childbirth observing or having a reasonable opportunity to observe the condition herein defined, and within six hours thereafter, to report in writing or by telephone, followed by a written report, such fact to the local health authorities of the city, town, village, or any other political division as the case may be, in which the mother of any such infant may reside; provided, that such reports and the records thereof shall be deemed privileged information and shall not be open to the public.

The Royal London Ophthalmic Hospital the earliest special hospital for diseases of the eye every year treats over 2,300 in-patients and over 40,000 out-patients from all parts of the United Kingdom. It has a world wide

reputation as a center for ophthalmic teaching. But it is now in very urgent need of help, to carry on its national work of saving or restoring eyesight.

The outstanding facts shown by its accounts are that in the past year the income fell short of the expenditure by 4,665 pounds. It would be misleading to conclude that there has been a general decrease in the various items which form the total income for the year. The annual subscriptions which have lapsed from ordinary causes have been made good by new subscribers; but donations have fallen from 4,306 pounds in 1918 to 3,252 pounds in the past year. The income from donation boxes, which represent contributions from patients and their friends is greater than it has ever been before.

The expenditure has been heavy on account of the increased prices of all commodities, and the general increase in salaries and wages.

From the Income and Expenditure Account it is clear that a considerable increase of income must be obtained if the work of the hospital is to be carried on. It is not unreasonable that a hospital which has only a small endowment should look in the first place for some support from those who benefit by the treatment which is given. The Committee believe that when patients realize the serious financial position of the hospital they will give as generously as they can, and there will be further increase from the donation boxes.

The Committee invite every subscriber to increase his subscription if he can afford to do so, and endeavor to obtain new subscribers. They hope that by systematic appeals the range of contributors may be made wider. It is not right that the national work of this hospital should be supported by only some 1,500 persons. It is stated that nine out of every ten persons take no part in supporting voluntary hospitals. In some measure the reason for this must be that they do not realize the fact that the work of voluntary hospitals benefits every one, rich and poor alike. But for the training given by hospitals such as this there would be no ophthalmic surgeons or nurses. This voluntary hospital is carrying on work which benefits all people.

# OPHTHALMIC LITERATURE

These lists contain the titles of all papers bearing on Ophthalmology received within the preceding month. These titles are all in English, some of them modified to indicate more clearly their subjects. These subjects are grouped under appropriate heads the succession of groups being the same from month to month. In the group the papers are arranged alphabetically usually by the name of the author in heavy-face type. After the subject of the paper (Ill.) indicates the number of illustrations. (Pl.) the number of plates, and (Col. pl.) colored plates illustrating the article. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that discussion of the subject is published with it. Under Repeated Titles are indicated additional publication of papers already noticed. To secure the earliest possible notice writers may send copies of their papers, or reprints, to 318 Majestic Bldg., Denver, Colo.

## DIAGNOSIS.

- Healy, J. J.** Estimation of Degree of Neurasthenia by Perimetric Examination of Eyes. *Jour. Roy. Army Med. Corps*, v. 34, 1920, pp. 143-149.
- Hensen, H.** Etiology and Diagnosis of Acute Bilateral Blindness. *Münch. med. Woch.*, v. 67, 1920, pp. 601 and 637.
- Koeppel.** Intravital Microscopy of Eye with Gullstrand Nernst Lamp. *Deutsche med. Wochenschr.*, v. 46, p. 630.
- Peter, L. C.** Uniformity in the Essentials of Perimetry. *Amer. Jour. Ophth.*, v. 3, 1920, pp. 584-587.
- Repeated Titles.** Dufour. (v. 3, p. 237.) *Amer. Jour. Ophth.*, v. 3, p. 621. Lindahl. (v. 3, page 318.) *Amer. Jour. Ophth.*, v. 3, p. 621.

## THERAPEUTICS.

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- Miller, E. B.** A Word to the General Practitioner About the Handling of Eye Cases. *New York Med. Jour.*, v. 112, 1920, pp. 237-241.
- Müller, E.** The Therapy of the Practical Physician. Vol. 3 of the Fundamentals of Practical Medicine. Berlin, Julius Springer, 1920.

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- McKellar, J. H.** A Modified Eye Speculum, Supported from the Bony Framework About the Orbit. (1 ill.) *Amer. Jour. Ophth.*, v. 3, 1920, pp. 603, 604.
- Von der Heydt, R.** Optical Iridectomies. (Dis.) *Amer. Jour. Ophth.*, v. 3, 1920, p. 618.

## REFRACTION.

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- Boegehold, H.** Weiss' Estimation of the Astigmatism of Improperly Adjusted Punctal Lenses. *Zeitschr. f. ophth. Optik*, 1920, v. 8, pp. 10-16.
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**Hogue, G. I.** Headache in Its Relation to Eye Strain. *Wisconsin Med. Jour.*, v. 19, 1920, pp. 109-112.

**Laurance, L.** True Action of Lenses in Ametropia. *Institute Journal*, 1919, v. 8. Abst., *Amer. Jour. Physiol. Optics*, July, 1920, p. 251.

**Metzger, I. D.** Physiologic Considerations in Refraction. (Dis.) *Jour. Ophth. Otol. and Laryng.*, August, 1920, pp. 300-307.

**Pronger, C. E.** Vertigo. *Lancet*, July 31, 1920, p. 245.

**Sharp, W. N.** Are the Objective Findings of Refraction Work the Most Acceptable to the Patient? *Amer. Jour. Ophth.*, v. 3, 1920, pp. 597-600.

**Sheard, C.** How Bright Are the Stars and Why Is the Sky Blue. *Amer. Jour. Phys. Optics*, v. 1, 1920, p. 214.

## OCULAR MOVEMENTS.

**Baldino, S.** Determination of Heterophoria. (1 ill.) *Arch. di Ottal.*, y. 27, 1920, pp. 57-68.

**Bertor, H. M.** Interpretation of Dynamic Skiametric Findings. *Amer. Jour. Physiol. Optics*, v. 1, 1920, pp. 223-233.

**Bierende, F.** Oculomotor Paralysis in Pregnancy. *Zent. f. Gynäkol.*, May, 1920, p. 529.

**Black, M.** Squint; Voluntary Nystagmus, Operative Aphakia to Blind One Eye. (Dis.) *Amer. Jour. Ophth.*, v. 3, 1920, p. 620.

**Boerehold, H. L. J.** Schleiermacher and Ocular Movements. *Zeitschr. f. ophth. Optik*, v. 8, 1920, p. 1.

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**Heimann, E. A.** The Operative Treatment of Weakness of Convergence and Hyperopia. *Berl. klin. Woch.*, 1920, v. 57, pp. 157-158.

**Jackson, E.** Study of Binocular Diplopia. *Amer. Jour. Ophth.*, v. 3, 1920, pp. 627-629.

**Kleijn, A. de.** Vestibular Eye Reflexes Following Removal of One Side of Cerebrum. *Nederl. Tijdschr. v. Geneesk.*, 1920, 1, p. 841.

**Kleijn, A. de, and Magnus, R.** Tonic Labyrinthine Reflex of the Eye Muscles. *Arch. f. d. g. Phys.*, 1920, v. 178, pp. 179-192.

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- Cecchetto, E. Cure of Gonococic Conjunctivitis with Antigonococic Vaccine, and Method of Nicolle and Blazot. *Arch. di Ottal.*, v. 27, 1920, pp. 69-76.
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- Wessely, Phlyctenulosis and Scrofula. *Münch. med. Wochenschr.*, v. 67, 1920, p. 30.
- Widen Vinarta, E. Diplobacillus of Morax-Axenfeld. *España Oftal.*, June, 1920, pp. 181-186.
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